

SPECIFICATIONS
FOR A
COMMUNITY HIGH SCHOOL DISTRICT
SCHOOL DISTRICT NO. 151
MAROA -- ILLINOIS

CHARLES HARRIS - ARCHITECT
DECATUR - ILLINOIS



GENERAL CONDITIONS

1. PRINCIPLES AND DEFINITIONS:

(A) The Contract Documents consist of the Agreement, the General Conditions of the Contract, the Drawings and Specifications, including all modifications thereof incorporated in the documents before their execution. These form the contract.

(B) The Owner, the Contractor and the Architect are those named as such in the Agreement. They are treated throughout the Contract Documents as if each were the singular number and masculine gender.

(C) The word "Contractor" as herein used shall mean any party with whom the Owner has contracted in writing to do portions of the work included in these specifications. In order to distinguish between contractors the terms General Contractor, Heating Contractor, etc. will be used.

(D) Written notice shall be deemed to have been duly served if delivered in person to the individual or to a member of the firm or to an officer of the corporation for whom it is intended, or if delivered at or sent by registered mail to the last business address known to him who gives the notice.

(E) The term "work" of the contractor or Subcontractor includes labor or materials or both.

(F) All time limits stated in the contract documents are of the essence of the contract.

(G) The law of the place of building shall govern the construction of this contract.

2. PROPOSALS:

All bids or proposals shall be made on the form furnished by the Architect. No oral, telegraphic or telephonic bids or modifications of bids will be considered.

Proposal shall state definitely the work to be included, type of bond required, amount of check to accompany bid, date when bids will be opened and date of completion of contract.

Proposal shall be signed by the contractor, or his legal representative.

The Owner reserves the right to reject any or all bids.

3. EXECUTION AND INTENT OF DOCUMENTS:

The Contract Documents shall be signed in duplicate by the Owner and Contractor. In case of failure to sign the General Conditions, Drawings or Specifications the Architect shall identify them.

The Contract Documents are complementary, and what is called for by one shall be as binding as if called for by all. The intention of the Documents is to include all labor and materials reasonably necessary for the proper execution of the work. It is not intended, however, that materials or work not covered by or properly inferable from any heading, branch, class or trade of the specifications shall be supplied unless distinctly as noted on the drawings. Materials or work described in words which so applied have a well known technical or trade meaning shall be held to refer to such recognized standards.

If the bidder fails to sign the contract within ten days after written notice of the acceptance of his proposal or to furnish satisfactory bond within ten days after signing contract he shall forfeit to the Owner the check accompanying the bid.

4. BOND:

Bond shall be in the full amount of the contract and shall be personal or surety bond as stated in proposal. Form of bond and surety shall be subject to the approval of the Owner.

Bond shall remain in full force for thirty days after completion of work. Before the expiration of the above bond, a maintenance bond for five percent of the

contract shall be furnished and be in force for one year guaranteeing the replacement of work and material which may prove defective during the term of the contract.

5. DRAWING, DETAILS AND INSTRUCTIONS:

Unless otherwise noted in the Contract Documents the Architect shall furnish to the Contractor, free of charge, ten complete copies of the contract drawings and Specifications.

The Architect shall furnish with reasonable promptness, additional instructions, by means of drawings or otherwise, necessary for the proper execution of the work. All such drawings and instructions shall be consistent with the Contract Documents, true developments thereof, and reasonably inferable therefrom. The work shall be executed in conformity therewith and the Contractor shall do no work without proper drawings and instructions. In giving such additional instructions, the Architect shall have authority to make minor changes in the work, not involving extra cost, and not inconsistent with the purposes of the building.

The Contractor and the Architect, if either so requests, shall jointly prepare a schedule, subject to change from time to time in accordance with the progress of the work, fixing the dates at which the various detail drawings will be required, and the Architect shall furnish them in accordance with that schedule. Under like conditions, a schedule shall be prepared, fixing the dates for the submission of shop drawings, for the beginning of manufacture and installation of materials and for the completion of the various parts of the work.

The contractor shall keep one copy of all drawings and Specifications including detail drawings and instructions on the work, in good order, available to the Architect and to his representatives.

Should an error or discrepancy be found in any of the drawings or Specifications the same shall be immediately referred to the Architect for correction.

6. SHOP DRAWINGS:

The Contractor shall submit, with such promptness as to cause no delay in his own work or that of any other contractor, two copies of all shop or setting drawings and schedules required for the work of the various trades and the Architect shall pass upon them with reasonable promptness. The Contractor shall make any corrections required by the Architect, file with him four corrected copies and furnish such other copies as may be needed. The Architect's approval of such drawings or schedules shall not relieve the Contractor from responsibility for deviations from drawings or specifications, unless he has, in writing, called the Architect's attention to such deviations at the time of submission, nor shall it relieve him from responsibility for errors of any sort in shop drawings or schedules.

7. SAMPLES AND MODELS:

The contractor shall furnish for approval all samples as directed. The work shall be in accordance with approved samples.

All models shall be furnished by the Owner.

8. OWNERSHIP OF DRAWINGS AND MODELS:

All drawings, specifications and copies thereof furnished by the Architect are his property. They are not to be used on otherwork and, with the exception of the signed contract set, are to be returned to him on request, at the completion of the work. All models are the property of the Owner.

9. INSPECTION OF WORK:

The Owner, the Architect and their representatives shall at all times have access to the work whether it is in preparation or progress and the contractor shall provide proper facilities for such access and for inspection.

If the specifications, the Architect's instructions, laws, ordinances or any public authority require any work to be specially tested or approved, the Contractor shall give the Architect timely notice of its readiness for inspection, and if the inspection is by another authority than the Architect, of the date fixed for such inspection.

Inspections by the Architect shall be promptly made. If any such work should be covered up without approval or consent of the Architect, it must, if required by the Architect, be uncovered for examination at the Contractor's expense.

10. ARCHITECT'S STATUS, DECISIONS, ETC.

The Architect shall have general supervision and direction of the work. He has authority to stop the work if such stoppage is necessary to insure the proper execution of the contract. He is the interpreter of the conditions of the contract and the Judge of the performance.

The Architect shall, within a reasonable time, make decisions on all claims of the Owner or Contractor and all other matters relating to the execution and progress of the work or the interpretation of the Contract Documents.

The Architect's decisions, in matters relating to artistic effect, shall be final, if within the terms of the Contract Documents.

Except as above or otherwise expressly provided in these general conditions or in the specifications, all the Architect's decisions are subject to arbitration.

11. CORRECTION OF WORK:

The contractor shall promptly remove from the premises all materials condemned by the Architect as failing to conform to the contract, whether incorporated in the work or not, and the contractor shall promptly replace and re-execute his own work in accordance with the contract and without expense to the Owner and shall bear the expense of making good all work of other contractors destroyed or damaged by such removal or replacement.

If the contractor does not remove such condemned work and materials within a reasonable time, fixed by written notice, the Owner may remove them and may store the material at the expense of the Contractor. If the Contractor does not pay the expense of such removal within five days thereafter, the Owner may, upon ten days written notice, sell such materials at auction or at private sale

and shall account for the net proceeds thereof, after deducting all the costs and expenses that should have been borne by the contractor.

If the Architect and the Owner deem it expedient to correct work injured or done not in accordance with the Contract, the difference in value together with a fair allowance for damage shall be deducted.

Neither the final certificate nor payment nor any provision in the Contract Documents shall relieve the Contractor of responsibility for faulty materials or workmanship and he shall remedy any defects due thereto and pay for any damage to other work resulting therefrom, which shall appear within a period of one year from the time of installation. The Owner shall give notice of observed defects with reasonable promptness.

12. CHANGES IN WORK:

The Owner, without invalidating the Contract, may make changes by altering, adding to or deducting from the work, the contract sum being adjusted accordingly. All such work shall be executed under the conditions of the original contract except that any claim for extension of time caused thereby shall be adjusted at the time of ordering such change.

The Contractor shall do no work not called for on plans and specifications nor perform any work in a manner other than shown and described therein except on written notice from the Owner or the Architect.

The difference incost of any such change shall be determined by one or more of the following methods:

- (a) By estimate and acceptance in lump sum.
- (b) By unit prices named in the contract or subsequently agreed upon.
- (c) By actual cost of material and labor plus an allowance of ten percent on cost of material and fifteen percent on cost of labor.

- (d) If none of the above methods is agreed upon, the contractor, providing he receives an order as above, shall proceed with the work; no appeal to arbitration being allowed from such order to proceed.

In all cases except (a) the contractor shall keep an accurate record of all labor and material required to complete the additional work. These records shall be available for the Architect's checking at all times.

13. SUBSTITUTIONS:

Specific brands wherever called for are specified as a standard and the Contractor may, at his option, submit other brands equal in quality for approval. Any tests or other expense involved in investigating the substitutes shall be at the contractor's expense.

No substitutions will be permitted without the approval of the Architect.

14. CONTRACTOR'S DUTY AND SUPERVISION:

The contractor shall lay out all work, assume responsibility for all errors and give the work his personal supervision. He shall provide all tools, machinery, scaffolding, and other equipment necessary for the safe and proper execution of the work.

The Contractor shall keep on his work, during its progress, a competent foreman and any necessary assistants, all satisfactory to the Architect. The foreman shall not be changed except with the consent of the Architect, unless the foreman proves to be unsatisfactory to the Contractor and ceases to be in his employ. The foreman shall represent the contractor in his absence and all directions given to him shall be as binding as if given to the Contractor. Important directions shall be confirmed in writing to the contractor. Other directions shall be so confirmed on written request in each case.

The Contractor shall give efficient supervision to the work, using his best skill and attention. He shall carefully study and compare all drawings, specifications and other instructions and shall at once report to

the Architect any error, inconsistency or omission which he may discover.

Unless otherwise stipulated, the Contractor shall provide and pay for all materials, labor, ~~water~~, tools, equipment, light and power necessary for the execution of the work.

Unless otherwise specified, all materials shall be new and both workmanship and materials shall be of good quality. The Contractor shall, if required, furnish satisfactory evidence as to the kind and quality of materials.

The Contractor shall not employ on the work any unfit person not skilled in the work assigned to him.

15. LAWS, ORDINANCES AND PERMITS:

The contractor shall obtain and pay for all permits and licenses, but not permanent easements, and shall give all notices, pay all fees and comply with all laws, ordinances, rules and regulations bearing on the conduct of the work as drawn and specified. If the Contractor observes that the drawings and specifications are at variance therewith, he shall promptly notify the Architect in writing, and any necessary changes shall be adjusted under Article 12.

16. ROYALTIES AND PATENTS:

The contractor shall pay all royalties and license fees. He shall defend all suits or claims for infringement of any patent rights and shall save the Owner harmless on account thereof.

17. LIABILITY INSURANCE:

The Contractor shall take out and maintain such insurance as will adequately protect himself, the Owner and the Architect from all liability for injury or death to employees or other persons under the Illinois Workmen's Compensation Act, House Bill No. 841 and from the claims of damages for persons injured or whose death was caused by operations conducted under this contract.

18. FIRE AND OTHER INSURANCE:

The Owner shall effect and maintain fire, lightning and tornado insurance upon the entire structure on which this contract applies and upon all materials in or adjacent thereto and intended for use therein or at least eighty percent of the insurable value thereof; the loss, if any, shall be made adjustable with and payable to the Owner as Trustee for whom it may concern.

Policies shall be open to inspection by the Contractor. The Contractor shall assist the Owner in determining the insurable value of material stored at the site and incorporated in the work. He shall also notify the owner in writing at such time as the building is insurable.

19. SEPARATE CONTRACTS:

The Owner reserves the right to let other contracts in connection with this work. The Contractor shall afford other contractors reasonable opportunity for the introduction and storage of their materials and the execution of their work and shall properly connect and coordinate his work with theirs.

If any part of the contractors work depends for proper execution or results upon the work of any other contractor, the contractor shall inspect and promptly report to the Architect any defects or interferences in such work that render it unsuitable for such proper execution and results. His failure so to inspect and report shall constitute an acceptance of the Contractor's work, except as to defects which may develop in the other Contractor's work after the execution of his work.

To insure the proper execution of his subsequent work the Contractor shall measure work already in place and shall at once report to the Architect any discrepancy between the executed work and the drawings.

20. CONTRACTOR'S MUTUAL RESPONSIBILITY:

Should the contractor cause damage to any other contractor on the work, the contractor agrees, upon due notice, to settle with such contractor by agreement or arbitration, if he will so settle. If such other Con-

tractor sue the Owner on account of any damages alleged to have been so sustained, the Owner shall notify the Contractor, who shall defend such proceedings at the Owner's expense and, if any judgment against the Owner arises therefrom, the Contractor shall pay or satisfy it and pay all costs incurred by the Owner.

21. SUB-CONTRACTS:

The contractor shall, as soon as practicable after the signature of the contract, notify the Architect in writing of the names of sub-contractors proposed for the principal parts of the work and for such others as the Architect may direct and shall not employ any that the Architect may object to as incompetent or unfit.

If the Contractor has submitted before signing the contract a list of sub-contractors and the change of any name on such a list is required by the Architect or Owner after signature of Agreement, the contract price shall be increased or diminished by the difference between the two bids.

The Architect shall, on request, furnish to any sub-contractor, wherever practicable, evidence of the amounts certified to on his account.

The Contractor agrees that he is as fully responsible to the Owner for the acts and omissions of his sub-contractors and of persons either directly or indirectly employed by them, as he is for the acts and omissions of persons directly employed by him.

Nothing contained in the Contract Documents shall create any contractual relation between any sub-contractor and the Owner.

22. ASSIGNMENTS:

Neither party to the contract shall assign the contract without the written consent of the others, nor shall the contractor assign any money due or to become due to him hereunder, without the previous written consent of the Owner.

23. PROTECTION OF WORK AND PROPERTY:

The contractor shall continuously maintain adequate protection of all his work from damages and shall protect the Owner's property from injury arising in connection with this contract. He shall make good any such damage or injury, except such as may be directly due to errors in the Contract Documents. He shall adequately protect and be responsible for damage to adjacent property as provided by law and the Contract Documents.

24. USE OF PREMISES:

The contractor shall confine his apparatus, the storage of materials, and the operations of his workmen to limits indicated on the plans or as required by law, ordinances, permits or directions of the Architect and shall not unreasonably encumber the premises with his materials.

The contractor shall not load or permit any part of the structure to be loaded with a weight that will endanger its safety.

The contractor shall enforce the Architects instructions regarding the signs, advertisements, fires and smoking.

25. CLEANING UP:

The contractor shall at all times keep the premises free from accumulations of waste material or rubbish caused by his employees or work and at completion of the work he shall remove all his rubbish from and about the building and all his tools, scaffolding, and surplus materials and shall leave his work "broom clean" or its equivalent, unless more exactly specified. In case of dispute, the Owner may remove the rubbish and charge the cost to the several contractors as the Architect shall determine to be just.

26. CUTTING, PATCHING AND DIGGING:

The contractor shall do all cutting, fitting or patching of his work that may require it/make its
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several parts come together properly and fit it to receive or be received by work of other contractors shown upon, or reasonably implied by, the Drawings and Specifications for the complete structure and he shall make good after them as the Architect may direct.

Any costs caused by defective or ill-timed work shall be borne by the party responsible therefor.

The contractor shall not endanger any work by cutting, digging or otherwise and shall not cut or alter his own work nor the work of any other contractor save with the consent of the Architect.

27. PAYMENTS:

Payment shall be made monthly upon request of the contractor and upon presentation by him of receipts or vouchers showing that all material and labor, including work of sub-contractors, upon which payment is requested has been paid for by him. Before any payment has been made the contractor shall submit to the Architect a schedule of values of the various parts of the work, including quantities aggregating the total sum of the contract. This schedule shall also state the amount of each sub-contract and shall be used as a basis for preparing statements. This schedule, when approved by the Architect, shall be used as a basis for certificates of payment. The Architect shall issue a certificate to the contractor in the amount he decides to be justly due within three (3) days after receipt of statement, when presented in proper form. Payment on certificate shall be made within seven (7) days after date of issue.

Should the Owner fail to pay the sum named in any certificate of the Architect or in any award by arbitration, upon demand when due, the contractor shall receive, in addition to the sum named in the certificate, interest thereon at the legal rate in force at the place of building.

No certificate issued or payment made to the contractor nor partial or entire use or occupancy of the work by the Owner shall be an acceptance of any work or materials not in accordance with this contract.

28. PAYMENTS WITHHELD:

The Architect may withhold or, on account of subsequently discovered evidence, nullify the whole or a part of any certificate for payment to such an extent as may be necessary to protect the Owner from loss on account of:

- (a) Defective work not remedied.
- (b) Claims filed or reasonable evidence indicating probably filing of claims.
- (c) Failure of the contractor to make payments properly to sub-contractors or for material or labor.
- (d) A reasonable doubt that the contract can be completed for the balance then unpaid.
- (e) Damage to another contractor.

When all the above grounds are removed, certificates shall at once be issued for amounts withheld because of them.

29. LIENS:

Neither the final payment nor any part of the retained percentage shall become due until the contractor, if required, shall deliver to the owner a complete release of all liens arising out of this contract, or receipt in full in lieu thereof and, if required in either case, an affidavit that so far as he has knowledge or information the releases and receipts include all the labor and material for which a lien could be filed. If any lien or claim remain unsatisfied after all payments are made, the contractor shall refund to the Owner all moneys that the latter may be compelled to pay in discharging such lien or claim, including all costs and a reasonable attorney's fee.

30. DELAYS:

If the contractor be delayed in the completion of the work by any act or neglect of the Owner or the Architect, or of any employee of either, or by any other contractor employed by the Owner, or by changes ordered in the work, or by strikes, lockouts, fire, unusual delay by common carriers, unavoidable casualties or any causes beyond the contractor's control, or by delay caused by the Architect pend-

ing arbitration, or by any cause which the Architect shall decide to justify the delay, then the time of completion shall be extended for such reasonable time as the Architect may decide.

No such extension shall be made for delay unless claim therefor is made in writing to the Architect. In the case of a continuing cause of delay, only one claim is necessary.

If no schedule is made under Article 5, no claim for delay shall be allowed on account of the failure to furnish drawings until two weeks after demand for such drawings and not then unless such claim is reasonable.

This article does not exclude the recovery of damages for delay by either party under article 32 or other provisions in the Contract Documents.

31. OWNER'S RIGHT TO DO WORK:

If the contractor should neglect to prosecute the work properly or fail to perform any provision of this contract the Owner, after three (3) days written notice to the Contractor, may without prejudice to any other remedy he may have, make good such deficiencies and may deduct the cost thereof from the payment then or thereafter due the contractor; provided, however, that the Architect shall approve both such action and the amount of the charge to the contractor.

32. DAMAGES:

If either party of this contract should suffer damage in any manner because of any wrongful act or neglect of the other party or of any one employed by him, then he shall be reimbursed by the other party for the damage.

Claims under this clause shall be made in writing to the party liable within a reasonable time of the first observance of such damage and not later than the time of final payment, except in case of claims under Article 11, and shall be adjusted by agreement or arbitration.

33. ARBITRATION:

Except in matters of artistic effects, all questions of dispute may be submitted to arbitration at the request of either party to the dispute.

The demand for arbitration shall be filed in writing with the Architect, in the case of an appeal from his decision, within ten days of its receipt and in no case later than date of final payment except as to questions arising under Article 11.

If the Architect fails to make a decision on any question under dispute, within a reasonable time, an appeal to arbitration may be taken as if the decision had been rendered against the party appealing.

No one shall be nominated or act as an arbitrator who is in any way financially interested in this contract or in the business affairs of either the Owner, Architect or contractor.

The general procedure shall conform to the laws of the State of Illinois.

Should the party demanding arbitration fail to name an arbitrator within ten days of his demand, his right of arbitration shall lapse.

SPECIFICATIONS
FOR A
COMMUNITY HIGH SCHOOL BUILDING
SCHOOL DISTRICT NO. 151
MAROA - - - ILLINOIS

EXCAVATION

34 - GENERAL CONDITIONS:

The "General Conditions" pages 1 to 15 inclusive, apply to all contracts and form a part of and are included with these specifications for excavation work.

35 - SCOPE OF THE WORK:

The work under this contract includes all labor and materials required for excavating, including excavation for tunnels, back filling, and rough grading in accordance with the drawings and these specifications.

Trenches for underground piping, sewers, etc. shall be excavated and back filled under other contracts.

All sheathing, shoring, sheet piling, bracing, etc. required for excavation shall be included under this contract.

This contract shall also include all labor, etc. required to clear site of fences, stone and other obstructions.

36 - CLEARING THE SITE:

This contractor shall remove from the premises all fences, boulders, etc. encountered on the site or in the excavation.

37 - PROTECTION OF PROPERTY:

This contractor shall protect all fences surrounding the school property from damage while work under this contract is being performed. Fences shall not be used as a hitching place for teams nor shall material or equipment of any kind be stored against them.

Water pipes crossing the site or encountered in the excavation shall not be destroyed but shall be carefully protected until removed by others.

38 - LAYING OUT THE WORK:

This contractor shall be responsible for the correct laying out of his own work from the lines and bench marks or levels furnished by the Architect. He shall furnish and set all stakes, batterboards, etc. and transfer all levels required in his work to conform to the requirements of the plans and specifications.

39 - REMOVAL OF TOP SOIL:

This contractor shall remove the top soil to a depth of 8 inches from the area covered by the building and for a distance of ten feet on all sides and store separately as directed by the Architect for use in finish grading.

40 - EXCAVATION:

This contractor shall do all excavating required for all work as shown by the drawings or required by these specifications.

The contractor shall excavate for all footings, foundations, areas, stairs, floors, etc. to the exact levels required. Excavation for all floors on soil shall extend to bottom of fill.

This contractor shall not excavate closer than three inches to exact level shown for bottom of footings until the contractor for concrete work is ready to pour. Final excavation for footings shall be made not more than two hours before footings are poured. Footing trenches shall be cut to exact width and levels shown with all crumbs, water, mud, etc. removed and with bottom of excavation firm and solid, before concrete is poured. In case unsuitable soil is encountered beneath footings, the Architect shall be notified and upon his orders, the excavation shall be extended until solid earth is found. The additional excavation to be executed for same unit prices as other similar work. The Architect shall approve the condition of all soil before footings are poured. All excavations, except for footings, shall extend at least twelve inches outside of wall lines to provide room for installation of water proofing.

41 - SHORING AND SHEETPIILING:

This contractor shall furnish and place all shoring and sheet piling required. It shall be installed in all cases in such manner that it can be removed after serving its purpose. In no case shall material of this kind be left buried except by permission of the Architect.

42 - PUMPING:

This contractor shall keep all excavations free from water until all concrete footings and floors have been installed.

43 - DISPOSAL OF DIRT:

All top soil shall be disposed of as called for in Article #39. All other soil from excavation shall be used for fill under floors, backfill and for rough grading. Clay only shall be used for fill under concrete floors and shall be placed in layers rolled or tamped in place. Clay fill under floors shall be brought to within 8 inches of the level of finished floors except in Gymnasium where it shall be brought to within 14 inches of the level of the finished floor.

44 - BACKFILL:

After all footings, foundations and area walls are built and properly set, all form lumber removed and footing drains placed, this contractor shall backfill the excavation about them using cinders, gravel or crushed stone to a depth of 8" over the footing tile, and the remaining space with clay to within 1 ft. of finished grade; all shall be well soaked with water, tamped and puddled to avoid future settlement. Fill about interior wall shall be placed in the same manner except that cinders, gravel or crushed stone will not be required as footing drains will not be used except around the outside of exterior walls.

45 - ROUGH GRADING:

This contractor shall do all rough grading over the entire premises. Clay shall be used for rough grading and left within three inches of finish grade. Finish grading and seeding will be done by the Owner.

46 - REMOVAL OF RUBBISH:

This contractor shall remove all his shoring, sheetpiling equipment, etc. as soon as this branch of the work is complete.

47 - DRAIN TILE:

All drain tile, area drains, storm and sanitary sewers will be furnished and installed by others.

CONCRETE WORK

48 - GENERAL CONDITIONS:

The "General Conditions", pages 1 to 15 inclusive, apply to all contracts and form a part of and included with these specifications for concrete work.

49 - SCOPE OF THE WORK:

This contract shall include all concrete, either plain or reinforced of every description, including all footings, foundation walls, plain and reinforced floor slabs, cement base, cement topping for floors, stairs, etc. concrete steps, piers, etc. It shall also include the furnishing and placing of all reinforcing steel, tile, fill under floors, the furnishing and erection of all forms and any other concrete work indicated or specified for the full and complete erection of the building.

50 - LAYING OUT AND CHECKING THE WORK:

This contractor shall lay out, check and be responsible for all lines, levels and for the correctness of his own work. He shall check the work of other contractors and report to the Architect for correction and adjustment any discrepancies found. He shall do all necessary cutting, patching and repairing of concrete in order to correct any errors in his own work.

51 - STANDARDS:

All material required for concrete work shall be furnished in accordance with the Standard Specifications of the American Society for Testing Materials and the American Specification Institute as they may apply. All concrete shall be equal to that made in a central mixing plant as approved by the Architect.

52 - MATERIALS:

Cement. All cement shall be Portland Cement, fulfilling the requirements of the latest Standard Specifications adopted by the American Society for Testing Materials and the United States Government, and of brand acceptable to the Architect.

Fine Aggregate. Fine aggregate shall consist of sand having clean, hard, durable, uncoated grains, free

from dust, clay, loam, organic matter or other injurious substances. It shall vary in size as follows:

Not less than 90% to pass through #4 sieve
Not more than 75% to pass through #8 "
Not more than 20% to pass through #40 "
Weight removed by decantation not over 3%

Coarse Aggregate shall consist of crushed stone or gravel having clean, strong, durable, uncoated particles free from soft, friable, elongated or laminated pieces, alkali, organic or other deleterious material. Coarse aggregate shall vary in size as follows:

To pass through	1½" ring	100%
" "	3/8" sieve not over	20%
" "	#4 " "	5%

Fine and coarse aggregate shall be stored separately. Bank run or mixed aggregate will not be satisfactory.

Steel. Reinforcing steel shall be of new billet stock, intermediate grade, conforming to the latest specifications for billet steel reinforcing bars adopted by the American Society for Testing Materials.

All bars shall be of an approved type of deformed bars. Bars shall be unpainted but free from rust, scale or other foreign matter. Steel shall be accurately bent to conform to drawings. Bends in all cases shall be not less than four times the least diameter of the bar. Where necessary to splice bars in tension the bars shall lap at least forty diameters.

All reinforcing steel for thin slabs over steel joists shall be 6" x 6" welded mesh with No. 6 wires in each direction. Mesh shall be or be equal as approved by the Architect to that manufactured by the American Steel and Wire Company,

Tile. Tile for combined concrete and tile slabs, and for fill under floors shall be hard, well burned tile as approved by the Architect. Broken, chipped or badly twisted tile will not be acceptable.

Cinders. Cinders shall be clean, boiler house cinders.

Hydrated Lime or Celite shall fulfill the latest specifications of the American Society for Testing Materials.

Water. Water shall be obtained from the City Water System and shall be clean and free from any injurious material. This contractor shall pay for all water used and shall make and maintain all connections required.

53 - STORAGE OF MATERIALS:

Cement and lime shall be stored in a suitable building to avoid damage by the elements. Lumpy, dirty or damaged cement or lime shall not be used.

Aggregates shall be stored separately on wood floors in such manner as to avoid the inclusion of dirt or other foreign material.

54 - CONCRETE PROPORTIONS:

All plain and reinforced concrete shall consist of one part cement and six parts of aggregate - proportions of fine and coarse aggregate to be as directed by the Architect.

Cement topping shall consist of one part Portland cement to one and one half parts of fine aggregate.

All materials shall be measured by volume. Ninety-four pounds (one bag) of cement shall be considered as one cubic foot.

Fine and coarse aggregate shall be measured separately in measuring batch boxes or wheel barrows. Aggregate shall be accurately measured for each batch. Water shall be carefully measured in buckets or automatic measuring devices in such manner as to insure uniformity of mixture. Water must be used only in such quantity as to make concrete of such consistency that it can be worked and puddled into place with the least amount of voids and without separation. Consistency of concrete shall be measured by the slump test according to the latest specifications for workability of concrete of the American Society for Testing Materials.

Maximum slump shall not exceed:

Mass and reinforced concrete - 5 to 6 inches

Floor finish and topping - - - 2 to 3 "

55 - HYDRATED LIME OR CELITE:

Hydrated Lime or Celite shall be used for all concrete work except floor topping. Ten pounds of lime or

three pounds of celite shall be used to each cubic foot of cement. The proportions of cement and aggregates shall not be changed by the addition of the lime or celite as it will be used as an additional ingredient.

56 - MIXING:

Mixing shall be done in a batch mixer of an approved type which will thoroughly and rapidly mix the materials into a uniform, homogeneous mass.

The mixer shall be charged evenly with measuring boxes or wheelbarrows. Water shall be controlled by an automatic measuring tank or measured in buckets, in such manner that exactly the same amount of water shall be used in each batch.

The use of shovels for measuring ingredients of the mixture will not be satisfactory.

The entire contents of the mixer shall be discharged before recharging.

The mixer shall be cleaned at frequent intervals while in use.

The volume of material for each batch shall not exceed the manufacturer's rated capacity of the mixer

57 - TIME OF MIXING:

Each batch shall be mixed until the mass is uniform and homogeneous throughout. In no case, shall the time of mixing for each batch be less than $1\frac{1}{2}$ minutes after all ingredients are in the mixer.

58 - FORMS:

All forms for concrete walls, areas, tile joist floors, slab floors, steps, chimney caps, and all other concrete work which must be kept in exact position while setting, shall be of wood.

Wood forms may be constructed of rough or used lumber except where the surface of the concrete is to be left exposed. In this case, new M. & D. No. 1 lumber shall be used.

Form work shall be set to exact lines and grades, and securely braced and kept in position until concrete has

properly set. Forms in all cases shall be constructed with tight joints to prevent loss and to insure smooth surfaces.

Wood forms shall be left in position until concrete has properly set. Wall forms shall be left in place for at least twenty-four hours after pouring in 70 degrees F. weather and longer if weather is cooler. Forms for floors and reinforced work shall be left for not less than fourteen days after concrete has been poured and longer if so directed by the Architect.

Wood forms shall be removed carefully to prevent damage to concrete or displacement or removal of sleeves, inserts, or other work set by this or other contractors.

Floors, etc. shall be reshored or braced as directed by the Architect immediately upon removal of forms.

Any failure of concrete due to removal of forms shall be replaced by this contractor at his own expense.

No forms will be required for footings except for single 2 x 4's at the top to insure proper alignment and depth.

59 - PLACING REINFORCING STEEL:

Metal reinforcement shall be positioned accurately and securely against displacement by using annealed wire of not less than 12 gauge or suitable clips at intersections, and shall be supported on metal chairs, spacers or metal hangers. Parallel bars shall not be placed closer in the clear than one and one-half times the diameter of the bars.

Suitable devices shall be used to hold the reinforcement in position, both horizontally and vertically. These devices shall be sufficiently rigid to avoid displacement of the reinforcement during the placing of the concrete.

Reinforcing bars in tile joist slabs shall be supported 3/4" from the bottom of the slab except for top bars over supports where the bars shall be held within 1" of the top of the slab. Reinforcing steel in thin slabs over steel joists shall rest directly upon the joists and be held 1/2" from the bottom of the slab at all other points. Reinforcing steel in walls, footings, etc. shall be placed as indicated on the drawings or hereinafter specified.

60 - BAR CHAIRS AND SPACERS:

All bar chairs, high chairs and spacers shall be or be equal as approved by the Architect to the "Securo" Supporting and locking spacers as manufactured by the Metal Building Materials Company, Chicago, Illinois. Spacers and chairs shall be used not over four feet on center for supporting steel in top and bottom of joist and slab.

The top bars of tile joist slabs shall be tied to 3/8" bars spaced approximately 18" o.c. The 3/8" bars shall be supported on bar chair placed on top of tile.

61 - WORK FOR OTHER CONTRACTORS:

This contractor shall build in all anchors, inserts, bolts, nailing strips, sleeves, etc. furnished and set by other contractors.

This contractor shall notify other contractors when forms, steel, etc. are in place ready to receive their work.

This contractor shall install the work furnished by him at such time and in such manner as not to delay other work on the building.

62 - DEPOSITING CONCRETE:

All debris, hardened concrete, chips, blocks and other foreign materials shall be removed from forms before any concrete is poured. Wood forms shall be thoroughly wetted down before pouring. Concrete shall be handled from the mixer as rapidly as practicable and deposited in the forms in such manner as to prevent separation or loss of the ingredients. It shall be deposited in approximately horizontal layers as rapidly and continuously as practicable until the unit of operation, as approved by the Architect, is completed.

Concrete footings shall be poured as rapidly as the footing excavations are completed and approved.

Concrete shall be thoroughly puddled and compacted into place by means of spades, rods or other suitable tools. The concrete shall be thoroughly worked around reinforcing steel, tile, embedded fixtures, work set by other contractors, into the corners of forms, etc.

Concrete shall be deposited carefully to avoid damage to tile, form work, and work of other contractors.

63 - BONDING AND JOINTING:

The surface of the hardened concrete to which the new work is to be joined shall be thoroughly wetted, cleaned, laitance removed and roughened. A wash of neat cement paste shall then be carefully brushed and worked over the surface of the joint and followed immediately with the fresh concrete which shall be thoroughly puddled, rodded and worked into place.

Construction joints shall be made square with the face of the work and shall be located as directed by the Architect. Construction joints in floors shall, in general, be located near the center of the span.

64 - PROTECTION:

All concrete work shall be protected from damage due to rough treatment, etc.

Surfaces of concrete, in all cases shall be kept thoroughly wetted for a period of at least seven days after pouring and finishing.

65 - FREEZING WEATHER:

Concrete shall not be mixed or placed at a freezing temperature unless special precautions, as approved by the Architect, are taken to avoid the use of material containing frost; to provide means to prevent freezing after pouring, and to keep it at a temperature of not less than fifty degrees F. for a period of seven days after placing.

66 - SURFACE FINISH:

The interior of all area walls, including the interior of walls at sides of exterior basement entrances, and the exterior of walls to a depth of three inches below grade, and the exposed edges of entrance slabs, exterior basement steps, etc. shall be finished immediately after forms are removed by filling all voids with mortar as hereinbefore specified for for topping, then rubbing with a soft wood float to a true, uniform surface. The surface of the wall shall be kept wet while being rubbed. Uneven places shall be smoothed by rubbing and not by plastering. In order to properly fill the small voids left by air bubbles, it will be satisfactory to keep the wood floats wet during the process of rubbing, by dipping in a soft paste of neat cement.

The concrete base and exposed parts of the chimney cap shall also be finished as specified above.

67 - FOOTINGS:

All footings shall be of concrete as hereinbefore specified for reinforced concrete and shall be of exact sizes and placed at levels as called for on plans.

Wall footings shall be reinforced longitudinally with three 5/8" ϕ bars placed 3 inches from the bottom of the footing. All other footings shall be reinforced as called for on the drawings. Reinforcing steel in footings shall be placed 3" from the bottom, securely tied and held in place while concrete is being poured. Footings shall be poured as near continuously as possible and within three hours after the excavation for them has been completed. Where wall footings occur at different elevations, bulk heads shall be placed and the higher sections extended down full size to the top of the lower footing. Footings shall be placed only on level, clean cut, solid earth as approved by the Architect. Forms will not be required for footings except at the top where they will be used to determine the exact width and exact elevation of the top of the footing.

68 - FOUNDATION WALLS:

Walls at edges of entrance slabs and walls at sides of exterior basement entrances shall be of concrete of height and thickness indicated on the drawings. The top of the walls at the sides of the exterior steps and inclines to the basement shall be finished with a trowel as hereinafter specified for basement floors. Exposed corners of walls shall be neatly rounded. Exposed sides of walls shall be finished as hereinbefore specified in Article No. 66.

69 - AREA WALLS AND FLOORS:

Areas shall be constructed as indicated on the drawings with 6 in. reinforced walls. Walls shall be reinforced with 3/8 in. ϕ bars placed 12 in. o.c. each way. Walls shall extend to solid earth at the bottom and be poured and bonded to the foundation walls. All exposed surfaces of walls shall be finished as hereinbefore specified. Floors of areas shall be of concrete constructed as hereinafter specified for basement floors. Floors shall be placed on a 4 in. bed of cinders or gravel fill and be pitched to and neatly finished about cast iron strainers of the floor drains.

Window sills in areas shall be finished at the same time and as a part of the area floors.

70 - BASEMENT ENTRANCES:

The exterior entrance to room under stage and to the boiler room shall each be constructed as indicated on the drawings. Walls at the sides of the inclined floor or drive to the room under the stage and at the sides of the steps to the boiler room shall be of concrete, finished as called for in Article No. 66. Walls shall be of thickness indicated on the drawings and reinforced as specified above for area walls. Floor or drive to room under the stage shall be of concrete placed over a 4 in. fill of cinders or gravel. Base slab shall be $4\frac{1}{2}$ in. thick with $\frac{1}{2}$ in. finished top placed and finished as a part of the base slab. Slab shall be screeded to exact lines and grades and finished by floating, troweling and finally floating to a dense, even, uniform surface. Slab shall be installed with a slight pitch to floor drain. The steps to the entrance to the boiler room shall be of dimensions as indicated on the drawings. Fronts of steps shall be finished as specified above for surface finish. Tops of steps shall be finished as called for above for slab of entrances to room under the stage. Steps shall be formed as a part of the slab with a minimum thickness of 4 in. at the base of tread and riser. Floor at bottom of step shall be of the same thickness and finished in the same manner as slab leading to room under the stage. Steps and slab shall be placed on 4 in. fill of cinders or gravel.

71 - CONCRETE STEPS:

Steps or stairs from the Gymnasium to the room under the stage shall be of concrete. Steps shall be of width and height as indicated on the drawings and shall be placed and finished in the same manner as called for above for exterior entrance to boiler room. This contractor shall also furnish and install concrete in the steel pans for all other stairs except steps from the stage to the Gymnasium. Concrete in steel pans shall be mixed as heretofore specified for plain and reinforced concrete and finished with a $\frac{1}{2}$ in. top as hereinafter specified for basement floors.

72 - BASE:

The base on exterior of building from approximately three inches below grade to the lower edge of the brick work shall be of concrete as hereinbefore specified for plain reinforced concrete. Concrete base shall be poured in place after the foundation wall and the first floor system has been installed. Wood forms shall be used for the exterior of the base only.

Special care shall be used in constructing the forms to provide a straight, true and even surface; Forms shall be removed within twelve hours after the concrete has been poured and the surface finished as called for in Article No. 66. Concrete of which the base is formed shall be carefully placed and thoroughly puddled to prevent lines of separation, voids, etc. The base shall be reinforced and finished at the top as indicated on the drawings.

The portions of the foundation wall and the first floor slab against which the base is poured shall be made thoroughly wet before pouring and the concrete shall be puddled to insure proper bond to the wall and floor.

Base shall be poured in sections in such manner as to avoid construction joints except as noted on the drawings. Construction joints, where noted, shall be straight, true and even and shall be formed by inserting a narrow strip of wood in the joint at the time of pouring which shall be removed and the space pointed with mortar as hereinafter specified for masonry work.

73 - REINFORCED FLOORS - TILE JOISTS:

The portion of the structural slab for the first floor over the boiler, coal and germinating rooms shall be of tile joist construction as indicated on the plans. The finish top shall be poured as a part of the structural slab but shall be poured as a separate operation. The top of the base slab shall be carefully screeded with a uniform level surface. Surface of the slab shall be roughened with a broom to remove all laitance before final set has occurred. Tile shall be accurately placed, leaving the joists straight and uniform throughout their length. Spacing of the tile shall be made in such manner as to leave one complete joist next to walls, steel beams, etc. Tile forming the joist shall be started approximately 12" in from the center of the wall at the ends of the joists in the center of the span.

Reinforcing bars shall be arranged as indicated on the drawings with one straight bar and one bent bar in each joist; the bent bar, in each case, shall extend to near the top of the slab at the quarter point of the span and extend over the support to the quarter point of the span in adjacent panel. Each joist shall be reinforced with one 5/8" straight bar and one 3/4" bent bar with 3/8" ϕ temperature bars crossing them at 18" o.c. Temperature bars may be used to space the top steel of the joist as hereinbefore specified.

Steel shall be securely held in place

while concrete is being poured. Slab shall be finished with a 1/2" thick coat of finish topping as hereinbefore specified. The base slabs shall be carefully cleaned, wetted and coated with a paste of neat cement immediately before the finish top is applied. The finish top shall be carefully screeded, floated and trowelled to a dense, uniform, even surface as hereinafter specified for floors on soil.

74 - REINFORCED FLOORS ON STEEL JOISTS:

The structural floor of ^{parts of the first floor, of} the stage and dressing rooms, the entire second floor and the roof shall be of reinforced concrete supported on steel joists or steel beams. Steel joists and beams shall be furnished and placed by others. Forms for concrete over the steel beams and joists shall be of wood and shall be placed directly beneath the upper flange of the beam, allowing the concrete to partially encase them. Concrete slabs over steel shall, in all cases be approximately 2 1/2 in. thick. All floors shall be finished with 1/2 in. finish top of cement topping as hereinbefore specified, placed integrally with the base slab and forming a part of it. The floors shall be carefully screeded to an exact level and finished as hereinafter specified for floors on soil. Steel joists shall be braced if necessary to prevent vibration while the floors are being poured. All floors supported on steel shall be reinforced with 6" x 6" welded mesh as hereinbefore specified. The mesh shall rest directly on top of the steel beams or joists and shall be kept approximately 1/2 inch above the bottom of the slabs between the joists. Reinforcement shall be lapped and made continuous in every direction. Concrete shall be carefully placed to avoid damage to forms or other or other construction and puddled to thoroughly encase the reinforcing and shall form a dense, homogeneous mass free from voids, unevenness, etc. Steel beams shall be shored, if necessary, while pouring to prevent vibration.

Loops of No. 10 soft annealed wire shall be embedded in the soft concrete of the stage and dressing rooms for anchoring screeds. These shall be placed in rows 16 in. o.c., normal to the front of the stage and three ft. o.c. parallel to the front.

75 - FLOORS ON SOIL:

The Gymnasium and the center section of the first floor as indicated on the drawings, as well as all the rooms in the basement, shall have a concrete floor supported di-

rectly on the soil over a fill of gravel or cinders. The portion of the first floor where concrete rests on the soil will have a deep fill of clay under the fill of gravel or cinders noted above. The clay fill will be placed and puddled by the excavating sub-contractor. This contractor, however, shall be responsible for the density of the fill and shall assist in puddling and placing it to avoid further settlement. He shall also assist in the final leveling and grading and shall replace all sections where settlement occurs.

The section of the floor supported directly on the soil will not be placed until the walls are practically complete and the second floor and roof in place. After the clay fill has been tamped solidly and graded to the proper elevation, it shall be covered with cinders or gravel to a uniform depth of four inches. After the layer of gravel or cinders has been tamped and screeded to the proper elevation, it shall be covered with a $3\frac{1}{2}$ inch layer of concrete mixed as hereinbefore specified for plain and reinforced concrete. The concrete shall then be puddled, tamped and screeded, then finished immediately with a $1\frac{1}{2}$ inch thick coat of topping as hereinbefore specified for top coating. Screed to exact level as called for on drawings, then finish by floating and troweling to a perfectly true, dense, even and smooth surface.

All floors shall be brought to an exact level except those in the boiler room which will be pitched slightly to the drains as indicated. The finish top of the floor, as called for above, will not be required in the Gymnasium; the base slab, however, will be carefully screeded to receive the wood floor. Wires, as called for above for anchoring screeds to the structural slab of the stage shall be installed throughout the Gymnasium. The concrete slab of the Gymnasium shall be installed at the proper elevation to bring the finish wood floor to an exact level with concrete floor in adjoining rooms. Concrete floors will be installed without markings of any kind and shall be carefully protected and cured as specified. Portions of above floors over tunnels shall be of same thickness as floors on soil and reinforced with mesh as specified for slabs over steel beams.

76 - ENTRANCE PLATFORMS:

This contractor shall install concrete platforms of sizes indicated on the drawings at all entrances. Entrance slabs, shall in all cases, be placed over foundation walls around the outside edges extending four feet below grade.

The entrance slabs shall be installed over cinder

or gravel fill and shall be of the same thickness and installed in the same manner as specified above for other floors on soil except that the finish top shall be screeded with a pitch of $1\frac{1}{2}$ in. to the outside edge and shall be finished by floating, troweling and finally floating to a true, dense, even, uniform, floated finish. The exposed corners of all entrance slabs shall be neatly rounded with a narrow edging tool.

77 - CHIMNEY CAP:

Chimney cap shall be of concrete as indicated on the plans. Cap shall be cast in place in a single unit without construction joints and shall be of dimensions shown. Cap shall be reinforced with two continuous $3/8"$ ϕ bars placed approximately $1/2$ in. from the exterior surface. The base of the cap shall be of plain concrete mixed as hereinbefore specified. Top and edges shall be finished with a $1"$ thick coat of cement topping as hereinbefore called for. Sides of top shall be finished as hereinbefore specified for surface finish.

78 - LINTELS:

Lintels over all openings in exterior walls above the basement and over the openings in the exterior walls of the agricultural laboratory shall be of steel furnished and installed by others. All lintels over openings in interior walls and partitions shall be of concrete. Lintels over all openings in the basement and the inner 8 inches of the lintels over future windows in the north and south exterior walls shall be poured as a part of the first floor system.

The size and type of reinforcing and the depth of all lintels shall be as indicated on the drawings. Concrete lintels occurring as a part of the floor system shall be furnished and installed by this contractor. Lintels for interior partitions above the basement shall be of Haydite concrete furnished and installed by others.

79 - CURING:

All cement floors shall be protected from injury and cured by covering with a two inch layer of soft wood sawdust or fine sand placed fourteen hours after the floor has been finished and kept wet for at least ten days. Floors shall also be protected from the direct rays of the sun and from freezing during the time of curing.

80 - CLEANING UP:

This contractor shall exercise extreme care in all cases to avoid concrete being splashed on or permitted to run over surfaces of other work, and shall carefully remove all concrete, stains from concrete, etc. from the work of other contractors. This contractor shall leave all work installed by him clean and perfect in every respect, and upon completion of his work shall immediately remove all his surplus materials, machinery, equipment, debris, etc. from the premises.

81 - GUARANTEE:

All work installed under this contract which shows defects within one year from date of acceptance shall be removed and replaced by this contractor without additional cost to the Owner. All work so replaced must be in strict accordance with plans and specifications.

MASONRY

82 - GENERAL CONDITIONS:

The "General Conditions", pages 1 to 15 inclusive, apply to all contracts and form a part of and are included with these Specifications for Masonry Work.

83 - SCOPE OF THE WORK:

This contractor shall furnish and install all materials, except lintels, for exterior walls, interior basement walls, all partitions including lintels over openings in partitions, chimneys, etc.

84 - STANDARDS:

All materials hereinafter specified shall be furnished in accordance with the standard specifications of the American Society for Testing Materials and of the American Specification Institute, as they may apply.

85 - MATERIALS:

Common Brick. All common brick shall be first quality, sound, hard burned and of standard size. Brick may be made of shale or clay but must be burned as noted above. Medium burned or Salmon brick will not be satisfactory.

Face Brick. Face Brick shall be No. 270 face brick as manufactured by the Decatur Brick Company, Decatur, Illinois. Brick shall be first quality, uniform in size and free from flaws which would impair their strength and durability, such as blows, warpage, etc. Face brick shall be smooth, lightly sanded, ranging in color from very dark red to browns and blacks. Approximately 20 percent shall be dark red, 70 percent brown and 10 percent smokes.

Concrete Blocks. All concrete blocks shall be of "Haydite" concrete as manufactured by the W. G. Traver Supply Company of Decatur, Illinois. Blocks shall be dense, of uniform texture and with sharp, unbroken edges.

Fire Brick. Fire brick shall be of first quality, vitrified fire clay, manufactured expressly to resist high temperatures. They shall be free from cracks, checks, warpage or other imperfections.

Out Stone. All out stone throughout shall be Standard Buff Indiana Oolitic Limestone.

Wall Ties shall be of corrugated type - 7/8 in. x 7 in. formed of 24 ga. galvanized iron.

Lime. Lime shall be made of best quality, freshly-burned lump lime slaked with cold water and screened through a 3/16 in. mesh screen into a settling box following the best practice employed in preparing lime for plastering. The lime putty thus prepared to stand in the settling box not less than four weeks and then be mixed with the sand and properly stacked to age.

In no case will the use of freshly slaked lime be permitted. The term "lime putty" will mean slaked lime with the water used in slaking, but without the addition of sand. Hydrated lime shall fulfill the latest specifications for Mason's hydrated lime of the American Society for Testing Materials. Hydrated lime shall be mixed with water to the consistency of a thick paste and permitted to stand for at least forty eight hours before using.

Cement. Cement shall fulfill the requirements of Portland Cement as called for under "Concrete Work".

Sand. Sand shall be clean, sharp, well graded sand, 100% passing a 1/8" screen, none passing a No. 100 screen and shall contain no injurious amount of organic or other deleterious matter and not over two percent of clay by weight.

Calking Cement. All cement for calking, bedding, etc. shall be "Vulcatex" as manufactured by the A. C. Horn Company of Long Island City, N. Y.

86 - WORKMANSHIP:

All work which is to be performed under this contract shall be done by mechanics skilled in their respective trades and all workmanship shall be first class in every respect.

87 - SAMPLES:

Samples shall be submitted to the Architect of all materials except those named as a standard, including common brick, face brick, concrete blocks, wall ties, etc.

88 - EQUIPMENT AND SCAFFOLDING:

This contractor shall furnish, erect and maintain all scaffolding, mortar mixing boxes, sieves, wheel barrows.

mortar boards, etc. required for the installation of this work.

89 - CENTERING:

All wood supports, including centers for arches, lintels, etc. required to support masonry while the mortar is setting shall be furnished and set in place by the carpentry sub-contractor.

90 - SURVEY, GRADES, BENCHMARKS:

This contractor shall carefully check and verify all lines, levels and measurements established by other contractors and report to the Architect for adjustment any discrepancies found.

This contractor shall be entirely responsible for the proper laying out and construction of the work included in this specification. He shall accurately follow all lines, grades, etc. shown on the drawings.

91 - HOISTING:

All ladders, rope, pulleys, or other hoisting equipment required for the installation of work under this contract shall be furnished and maintained by this contractor.

92 - CLEAN OUT DOOR, COAL CHUTE DOORS; ETC:

Clean out and coal chute doors will be furnished by others but installed by this contractor. Clean out door shall be placed at the base of the chimney just above the basement floor. Coal chute doors shall be placed as indicated on the drawings. This contractor shall also do all cutting, fitting and pointing required in the masonry walls to install railings, etc.

93 - BUILDING IN OTHER WORK:

This contractor shall build in all nailing blocks, inserts, frames, thimbles, anchors, bolts and other items furnished or set in place by other contractors and shall cooperate with these contractors in installing them.

All work which is to be built in by this contractor will be placed and braced securely by contractor furnishing it. This contractor shall see that this condition is met properly before building in the various items, and shall report any improper work to the Architect for correction before proceeding; any rebuilding of masonry re-

quired by negligence in reporting for corrections shall be at this contractor's expense.

This contractor shall furnish and install concrete nailing brick as manufactured by the W. G. Traver Supply Company of Decatur, Illinois for attaching black-board trim, wainscoting, wood base, etc. Blocks shall be installed at intervals not to exceed 2 ft. o.c. wherever wood trim occurs.

94 - PROTECTION OF FINISHED WORK:

This contractor shall cooperate with the carpentry contractor who will furnish and erect the necessary protection for sills and other exposed masonry liable to damage while the building is being erected.

Face brick walls, concrete blocks, and common brick walls shall be covered with a water proof covering at the end of each working period in such manner as to prevent damage from rain, snow, etc. Walls discolored or damaged from lack of protection must be rebuilt at the contractor's expense.

95 - CUTTING AND PATCHING:

This contractor shall do all cutting and patching or pointing of the work installed by him that may be required in the installation of the work or to accomodate the work of other contractors.

All cutting and patching shall be executed in a neat manner so as not to mar the appearance of the finished work.

96 - MORTAR:

Mortar for laying concrete blocks, face brick, common brick, partition blocks, etc. shall be composed of one part of Portland Cement, two parts of lime putty and three parts of clean, coarse sand. Mortar for fire clay brick shall be of fireclay. Mortar for plastering exterior walls below grade shall be composed of one part Portland Cement, one part lime putty and two parts clean, coarse sand. Mortar for setting and pointing cut stone shall be the same as specified for the face and common brick except white Portland cement shall be used in place of natural Portland.

97 - MIXING MORTAR:

All materials for mortar shall be accurately measured and shall be thoroughly mixed in batches of such size that each batch shall be entirely used within one and one-half hours after mixing.

Retempered mortar, or mortar which has taken initial set shall not be used. All mortar left over at the end of each day shall be removed from the site of the building at once and not rettempered and used.

Portland cement shall be measured as it is packed in its original package. All sand shall be measured in a gauged box. Lime putty shall be measured in a bucket as removed from the pit or slackening box. It will not be satisfactory to measure materials with shovels.

98 - BASEMENT WALLS:

All basement walls throughout the building shall be of Haydite concrete blocks. Walls shall be of thickness indicated on the plans; 8 x 8 x 16" blocks shall be used for 8" walls and for backing behind the concrete base on the 12" exterior walls; 8 x 12 x 16" blocks shall be used for 12" walls except where the concrete base occurs as noted above.

All walls shall be laid with true, level and even courses with all joints straight and uniform in size. One-half blocks shall be used for jointing and head joints in alternate courses shall be in same vertical line.

Blocks shall be thoroughly soaked with water and then laid with a full bed of mortar under the outer webs only. Vertical joints shall be made in a similar manner,-- the space between the outer web only being completely filled with mortar. Joints shall not be struck but shall be neatly cut even with the face of the blocks.

Blocks shall be carefully handled and placed in walls with true, even, unbroken edges. Blocks with chipped or broken edges on exposed face must not be used. Ends of blocks, where exposed must be finished the same as the sides.

99 - DAMP-PROOFING:

The outside of all exterior walls from the footing to the lower side of the concrete base shall be given a 3/4 inch coat of cement mortar as hereinbefore specified. After the mortar has set and is dry, it shall be coated with an asphalt primer and then given a heavy coat of hot asphalt thoroughly brushed or mopped into the surface forming a complete water proof coating.

100 - COMMON BRICKWORK:

Common brickwork shall be used for bringing walls

and partitions to the exact height to receive joists or floors, for constructing all portions of the chimney except the part exposed on the exterior and for the lining on the inside near the entrance of the boiler connection which will be of fire brick as hereinbefore specified.

All brick shall be laid in straight and level courses to exact lines and dimensions called for on plans. All brick shall be laid on full beds of mortar with all joints slushed full. All joints shall be uniform in size. Common brick shall be bonded to other work with header courses wherever possible. Where this cannot be done, wall ties, as hereinbefore specified shall be used. Ties shall be spaced not over 16 inches o.c. horizontally and vertically.

101 - FIRE BRICK:

Fire brick, as hereinbefore specified shall be used for lining the interior 4 inches of the lower part of the chimney for a height of fifteen feet above the footing. Fire brick shall be laid in fire clay with all joints slushed full.

102 - FACE BRICKWORK:

All exterior walls except where other material is called for shall be faced with four inches of face brick as hereinbefore specified. Soldier and header courses, where indicated on the drawings shall be of standard size face brick. Face brick shall also be used on the inner side of the exterior walls above the roof and for facing the chimney throughout its height above the concrete base.

Face brick shall be laid with garden wall bond, that is, five courses of stretchers alternating with one course of alternate header and stretcher. All headers shall be full headers and shall bond into special bonding Haydife blocks. Brick shall be laid to a line of straight, true and even courses. Height of courses shall be approximately 2 9/16 inches as required to bring courses to heights called for on plans. All spacing of brick, both horizontally and vertically shall be uniform and even. Brick shall be neatly cut about arches, etc. Small pieces of brick, - less than half brick - will not be satisfactory in corners, windows, doors, etc. Bond shall either be laid out or brick cut in such manner as to avoid them. Face brick shall be bonded to concrete block walls where header courses cannot be used with wall ties as hereinbefore specified. Ties shall be spaced not more than 16 " o.c. longitudinally and vertically. Ties shall be placed in the forms by this contractor and incorporated in the concrete work as it is poured.

Face brick shall be laid in cement mortar as hereinbefore specified with all joints completely filled. Joints shall be finished by cutting off the surplus mortar even with the face of the brick, then striking when the mortar is comparatively dry with the corner of a square edged hard wood strip. The strip of wood used for striking joints shall be straight and struck to a uniform depth. Care shall be used in laying facebrick and removing surplus mortar to avoid staining or coating face of brick with mortar.

Face brick, concrete blocks and common brick walls shall be covered with a water proof covering at the end of each working period in such manner as to prevent damage from rain, snow, etc. Walls discolored or damaged from lack of protection must be rebuilt at the contractor's expense.

103 - CONCRETE BLOCK BACKING:

All exterior walls from a point below grade as noted in Article No. 72 shall be backed up with 8 inches of Haydite concrete blocks as hereinbefore specified. Blocks shall be 8" x 8" x 16" with special blocks for bonding courses. 1/4, 1/2 and 3/4 blocks shall be used for bonding and finishing at corners, doors, windows, etc. Blocks shall be laid to a line with true, level and even courses. Blocks shall be laid on a full bed of mortar under the inner and outer webs only. All mortar shall be as hereinbefore specified for Haydite Blocks, common brickwork and face brickwork. The portion of the vertical joints between the inner and outer web shall be filled with mortar only. The center spaces in all cases shall be left open. The height of courses for all blocks shall correspond to that of the face brick.

Special care shall be used in selecting and laying the concrete block backing in the Gymnasium, Dressing rooms, and stage as the blocks will be left exposed and not plastered in these rooms.

104 - PARTITIONS:

All partitions in the basement shall be of Haydite blocks as hereinbefore specified. All partitions above the basement shall be constructed of 4" x 8" x 16 Haydite concrete blocks as indicated on the drawings. Partitions shall be accurately located and all blocks shall be laid up in the same manner as specified for basement walls. Blocks shall be fitted about the pipes, conduit, etc. as required. All blocks shall be laid with straight, true and even courses. Partitions about lockers and vents shall be constructed as

indicated on the drawings. All blocks for partitions about the Gymnasium shall be selected for evenness of texture and be free from broken corners, edges, etc. and laid with especial care and they shall be left exposed and not plastered. Joints in all partitions shall be cut off smooth with the face of the work and not struck.

105 - LINTELS:

Lintels over openings in interior basement partitions and over openings in exterior walls where noted on plans shall be of concrete furnished and installed as a part of the concrete floors. Lintels over all openings in exterior walls, except in basement, shall be of steel furnished by others but installed or built in by this contractor. Lintels over openings in interior partitions above the basement shall be of Haydite concrete of the sizes and reinforced as indicated on the drawings and installed as the partitions are built as a part of this contract. Reinforcing steel shall be of the type called for under concrete work.

106 - CUT STONE:

The belt courses above the second story windows, the coping over all exterior walls, including that over the wall at the sides of the stairway to the Agricultural Laboratory and the inclined coping built in the wall over the entrances, the upper and lower panels over the entrances, the plain and carved pilaster caps, the corner stone and other material indicated as such on the drawings shall be of cut stone as hereinbefore specified. All stone, both plain and carved, shall be cut in strict accordance with details. Copings and belt courses shall be jointed as indicated on the drawings. All stone work shall extend into the masonry walls at least four inches and steel or iron anchors will not be required. All stone work shall be set in mortar as hereinbefore specified with a uniform joint of 5/16". All stone shall be washed and thoroughly cleaned with clear water before setting. All head joints shall be raked out to a depth of one inch immediately after the stone has been set. Stone shall be set to a true and even line on full beds of mortar. All stone work shall be protected from damage by falling mortar, etc. until all work is completed. The exposed surface of all stone shall be planed but not polished. Corners and edges of stone shall be straight and true, free from spalls, and chipped and broken places.

The corner stone shall be of the size indicated on the drawings and shall be provided with an opening 6" wide, 12" long and 8" deep to receive records, etc.

107 - CALKING AND POINTING:

This contractor shall do all pointing of masonry walls as required to make the masonry work complete, water and weather proof. This shall include the filling of all nail holes where nails have been driven into mortar joints, etc. All calking and pointing must be done immediately after the brick have been laid and at least ten days before the walls are cleaned down. Cement mortar as hereinbefore specified shall be used for pointing and "Vulcatex" for calking about stonework, etc.

The face of all work which has been pointed shall be finished the same as all other mortar joints except where "Vulcatex" is used. Joints filled with "Vulcatex" shall be slightly rounded by striking with a metal jointer. Special care shall be exercised to keep all joints completely filled with mortar, including the spaces about window and door frames.

108 - CLEANING:

After all brickwork has been laid and all pointing and calking completed, and the mortar sufficiently set, this contractor shall remove all excess mortar and clean all exterior face brickwork by scrubbing with a solution of muratic acid composed of one part acid to ten parts of water. After scrubbing, walls shall be thoroughly washed with clear water. Cleaning must be completed before final coats of paint have been applied to exterior wood work.

Cut stone shall be cleaned by rubbing with fibre brushes dipped in clear water or water to which soap powder has been added. White sand may also be added to the soap powder if necessary to remove stains, etc. after cleaning, all exposed faces of stone shall be drenched with clear water and all evidences of soap removed.

109 - CLEANING SITE:

This contractor shall leave all work installed by him clean and perfect in every respect and upon completion of his work shall immediately remove all his surplus material, machinery, equipment, debris, etc. from the premises.

110 - GUARANTEE:

All work installed under this contract which shows defects within one year from date of acceptance shall be removed and replaced by this contractor without additional cost to the Owner. All work so replaced must be in strict accordance with the plans and Specifications.

STRUCTURAL STEEL AND MISCELLANEOUS
METAL WORK

111 - GENERAL CONDITIONS:

The "General Conditions", pages 1 to 15 inclusive, apply to all contracts and form a part of and are included with these specifications for Structural Steel and Miscellaneous Metal Work.

112 - SCOPE OF THE WORK:

The work included under this contract comprises the furnishing, fabrication and erection of all structural steel and iron work, and all ornamental iron and miscellaneous metal work of every description required to complete the building as called for on the drawings and as required by these specifications. It shall include the furnishing, fabrication and erection of all steel columns, beams, steel joists and rafters, lintels, anchor bolts, bolts and rivets for connections, steel stairs, railings, coal chute doors and frames, clean out door, anchors for joists, beams, etc. This contract shall also include such other work as hereinafter called for.

Ventilating grilles, registers and register faces will not be included in this contract but shall be furnished and installed by others.

113 - STANDARDS:

All materials and workmanship under this contract shall conform to the standard specifications of the American Society for Testing Materials, the American Institute of Steel Construction and the American Specification Institute, as they may apply.

114 - MATERIALS:

All Structural Steel shall be made by the open hearth process and shall conform to the standard specifications for structural steel for buildings of the American Society for Testing Materials.

All Cast Iron shall conform to the latest Standard Specifications for gray iron castings of the American Society for Testing Materials.

All Cast Steel shall be class "A", medium grade and shall conform to the latest standard specifications for steel castings of the American Society for Testing Materials.

Wrought Iron shall be low carbon soft steel, perfectly welded, uniform in sections, with clean, sharp, true edges and surfaces. Exposed surfaces shall be ground or draw filed until smooth, where any surface imperfections occur.

Structural Materials for ornamental iron work shall consist of structural rolled shapes of sizes and sections required. Where structural steel shapes are exposed they shall be machined or buffed to a smooth, even and uniform surface free from defects and imperfections.

Plate Work shall consist of basic open hearth steel plates that have been rolled and re-rolled to remove all buckling and unevenness.

115 - SHOP DRAWINGS:

This contractor shall submit shop drawings for all of the work under this contract to the Architect for approval before any work is started.

The Architect's checking and approval of shop drawings shall be considered as a precautionary measure, and shall not relieve this contractor of any responsibility for errors or omissions, such errors or omissions shall be made good at any time by this contractor, even after the work has been placed in the building.

Five copies of the final approved shop drawings will be furnished the Architect; one for the Architect's files and one for the Architect's Superintendent; one for the General Contractor's files and one for the General Contractor's superintendent; and one to return to this contractor with the Architect's approval.

116 - ERECTION MARKS:

Each piece of steel shall be marked plainly in a conspicuous place with an identification number together with the proper floor or story mark, to enable the erector to sort and erect the various parts with the least possible confusion. The respective erection marks shall be shown clearly on the erection diagram drawings, which this contractor shall provide as specified above.

117 - ARCHITECTURAL DRAWINGS:

It is understood that for the purpose of fabrication the architectural drawings shall be a part of the structural drawings. This contractor shall consult the architectural drawings, both small and large scale drawings, and shall check all steel details with the architectural requirements.

118 - MEASUREMENTS:

This contractor shall verify all measurements at the building and shall co-operate with other sub-contradors so that his work shall fit in with theirs.

119 - WORKMANSHIP:

All structural work shall be equal to the best practice in modern structural shops.

Drifting to enlarge unfair holes will not be permitted.

The several pieces forming built up sections shall be straight and fit close together, and finished members shall be free from twists, bends or open joints.

Rolled sections, except for minor details, shall not be heated.

Materials shall be straightened thoroughly in the shop by methods that will not injure the steel before being laid off or worked in any way. Sharp kinks or bends will be cause for rejection.

Compression joints depending upon contact bearing shall have the bearing surfaces truly faced after the members are riveted. All other joints shall be cut or dressed true and straight.

All ornamental and miscellaneous iron work shall be fabricated in accordance with the best practice in this class of work.

All work shall be carefully and accurately assembled. All joints shall be made in the most workmanlike manner, filed, milled and machined, so as to secure an absolutely close and perfect connection that cannot be readily detected by the eye.

Joints shall be carefully membered so as to preserve the forms of all moldings, profiles, ornament and the continuity of lines. All joints shall be welded, well secured with screws or riveted, but in any case the same shall be practically invisible.

All work shall be constructed in the largest practicable lengths. Small or single unit pieces shall be built and assembled in the shop in the largest practicable sections.

All work shall be assembled in the most substantial manner and reinforced where necessary with structural shapes, using concealed screws, bolts and similar fastenings.

The bolts shall have lock nuts and all exposed screws shall be countersunk unless otherwise noted.

This contractor shall carefully examine the structural steel and reinforced concrete drawings and he shall furnish and install all additional structural steel supports, bracing, anchorage, etc. and reinforcing required throughout in connection with the installation of the ornamental and miscellaneous metal work.

120 - RIVET SPACING:

The spacing of all rivets and all rivets required for connections shall be in accordance with the standards of the American Institute of Steel Construction. 3/4 inch rivets shall be used throughout. Rivets in built up members shall be spaced not to exceed 12 inches o.c. The number of rivets required and the spacing of rivets for each connection shall not exceed the following standards:

Shop Rivets - - -	{ Bearing - 24,000# per sq. in.
	{ Shear - 12,000# per sq. in.
Field Rivets - - -	{ Bearing - 20,000# per sq. in.
	{ Shear - 10,000# per sq. in.

121 - PUNCHING:

In material whose thickness is not greater than 11/16", holes may be punched 1/16" larger than the nominal diameter of the rivets. Holes in material of greater thickness shall be drilled. Where reaming is not required, the diameter of the punch shall be not more than 1/16" greater than the nominal diameter of the rivet, nor the diameter of the die more than 3/32" greater than the diameter of the punch. All punching shall be done accurately. Drifting to enlarge unfair holes will not be allowed. Where reaming is required, the punch used shall have a diameter smaller than the nominal diameter of the rivet by at least 3/16". Sub-punching for reamed work shall be done so accurately that after reaming no punched surface shall appear in the periphery of the hole.

122 - DRILLING:

Holes for rivets in material more than 11/16" thick shall be drilled 1/16" larger than the nominal diameter of the rivet. Burrs on the surface shall be removed.

Holes in ornamental and miscellaneous iron work and in all structural members used in connection with this class of work shall be drilled and reamed and not punched.

123 - REAMING:

Reaming, where required, shall be done after the pieces forming the built up member are assembled, and so firmly bolted together that the surfaces shall be in complete contact. Holes shall then be reamed up to a diameter not more than 1/16" greater than the nominal diameter of the rivet. If any burrs from reaming are forced between the pieces of a member, the pieces shall be taken apart and all burrs removed before riveting. If necessary to take the pieces apart after reaming, the respective pieces reamed together shall be so marked that they may be assembled in the same position in the final setting up. No interchanging of reamed parts will be allowed. The outside burrs on reamed holes shall be removed.

124 - ASSEMBLING:

All shop work in connection with structural steel shall be riveted. Riveted member shall have all parts well pinned up and firmly drawn together with bolts before riveting is commenced. Surfaces in contact are to be cleaned and painted before riveting. Abutting joints shall be cut or dressed true and straight and fitted closely together. In compression joints depending on contact bearing, the surfaces shall be truly faced, so as to have even bearing after they have been riveted up complete and are in perfect alignment. Joist shall be framed to beams with web connections.

All ornamental work shall be assembled with riveted joints or be welded as hereinafter called for. Rivets in ornamental and miscellaneous iron work, where exposed, shall be countersunk and ground down and finished the same as the surface of the material in which they are used. All rivets shall be driven with pressure riveters. Rivets shall be heated to a light cherry color their entire length at the time of driving and shall be free from slag, scale or carbon deposit. Heads of rivets after driving shall be hemispherical, neatly formed and concentric with the shaft of the rivet. Rivets shall be tight and shall completely

fill the holes and have the heads in full contact with the surface of members which they hold together. Recupping and recaulking will not be permitted. Beams shall be supported on brackets framed to columns with web connections, or framed directly to columns with web connections.

125 - BOLTS:

Machine bolts with lock washers may be used for all field connections; the bolts shall be of such length that the threads will be entirely outside of the bearing. Nuts shall have full thread and shall be turned tight, bringing the members solidly and firmly together. Threads of bolts shall be set to prevent the nuts from coming off. 3/4 inch bolts shall be used for field connections in all structural steel work. Smaller bolts, where necessary, may be used for assembling ornamental and miscellaneous iron work in the field. Bolts in ornamental and miscellaneous iron work shall have countersunk heads and be installed with lock washers, etc. as called for above for structural work.

126 - MILLING AND PLANING:

The top surface of base plates and the bottoms of columns shall be planed and faced to provide complete contact of the surfaces between the members after erection. Connecting angles shall be riveted to the base of columns before the members are milled.

127 - ERECTION AND INSTALLATION:

All structural steel and iron work shall be erected by the contractor as rapidly as the progress of the general work will permit.

Column base plates or plinths shall be grouted in Portland cement grout consisting of one part Portland cement to one part fine aggregate and set in a manner as directed by the Architect.

The contractor shall furnish all necessary cranes, derricks, hoisting apparatus, runways, planking, power and attendance required for the erection of the structural steel and iron work.

All derricks, engines and other hoisting apparatus shall be located so that every piece of steel and iron can be handled and set rapidly and in such manner as not to interfere with the work of other contractors while the steel and iron setting is in progress. All equipment shall be set

in such manner as not to injure any parts of the building.

This contractor shall check and verify all measurements at the building wherever necessary and shall consult with the various contractors installing work, regarding the methods to be employed in connecting the several materials.

All work shall be set accurately to lines and levels. Particular care shall be taken to have the work perfectly plumb and level before permanent connections are made and it shall be so maintained by the contractor until finally enclosed in the masonry; this contractor furnishing all necessary braces, struts, cables, etc. required for this purpose and for resisting stresses due to operation of derricks or other erection equipment. All members shall be connected temporarily with sufficient bolts to insure the safety of the structure until it is finally bolted.

This contractor shall provide all supports, bracing, blocking and other materials, do all drilling, cutting, chipping and fitting and make connections with the adjoining work wherever necessary.

128 - PLUMBING AND LEVELS:

This contractor shall check and verify all lines and levels and plumb all vertical members and shall be entirely responsible for their correctness.

Before starting the work, this contractor shall check all lines and previous work affecting his own, and shall report to the Architect for adjustment any discrepancies found. He shall examine shop drawings and see that they conform to his work.

129 - WALL PLATES:

All beams resting on walls shall have bearing plates. Bearing plates will be bedded in cement mortar, set in place and built in by the masonry sub-contractor but structural steel contractor shall co-operate with the mason in setting these and shall be responsible for all required lines and levels.

All bearing and wall plates shall be of sizes called for on plans and of single piece of metal.

130 - BRIDGING:

1" x 1" x 1/8" angles shall be used as detailed for bridging junior beams. One row of bridging shall be used

in each span. Bridging shall be cut to exact length and shall be carefully bent and driven into place in the field. One row of bridging shall be used in each span of more than 8 ft.

131 - LINTELS:

This contractor shall furnish lintels for all openings in exterior walls except where concrete lintels are called for. Lintels, in general shall consist of a structural beam welded to a 1/4 inch plate; size of beam and width of plate to be as called for on the plans. Plates shall be welded to the beams with two inch spots at intervals not to exceed 12 inches o.c. Lintels shall be of proper length to provide 8 inch bearing at each end. Lintels over first story openings shall be framed to ends of joists as indicated.

132 - ANCHOR BOLTS:

This contractor shall furnish 3/4" x 28" anchor bolts with 1/4" x 4" x 4" plates added to each end for securing roof system to exterior walls. Spacing of bolts shall be as noted on plans.

133 - STAIRS:

Stairs or steps from exterior to the boiler room; from exterior to the vestibule and passage at sides of the Gymnasium, and from the Agricultural Laboratory to the Gymnasium shall be of concrete furnished and installed by others. Stairs from basement to first floor and from first to second floor shall have 12 inch 10.6# channel strings with pressed steel risers and pans for concrete treads. Each riser and pan below shall be formed from a single piece of No. 12 gauge blue annealed sheet steel. Risers shall be integral with nosing as detailed. 1-1/2 inch x 1-1/2 inch x 3/16 inch angles shall be riveted or welded to the strings to support treads and risers. Angles 6 inches in length shall be used for attaching risers and angles 8 inches long to support pans. Pans and risers shall be attached to the angles with 1/4 inch round head machine bolts with lock washers. Three bolts will be required for each connection. Concrete fill for pans will be furnished and installed by others.

The channel wall string for the basement stairs and for the stairs from the first floor to the platform shall be supported at the lower end on angle connections resting on and bolted to the concrete floor with expansion bolts. The lower end of the wall strings from landing to second floor shall be framed to the beam at the front of the landing.

The upper end of all wall strings shall be framed to the beams at the front of the landings. All connections shall be concealed. The top flange at the ends of wall strings shall be bent, welded to web of channel and returned to the floor or landing level. Face strings shall be framed to cast iron newel posts with cap screw or pin connections. Newel posts shall be supported on and connected to floors and landings with angle connections. Angles shall be attached to posts with cap screws and to floors with cap screws or expansion bolts. Connections in all cases shall be concealed and shall be as approved by the Architect.

Pans shall be punched to receive hanger for suspended ceiling under stairs.

All newel posts shall be of cast iron as detailed. Metal of newels shall be not less than 3/8 inch thick.

Railings shall have balusters riveted or welded to 1-1/2 inch x 1/2 inch channel at top and to 1 inch x 1/2 inch channel at the bottom. Lower channel shall rest directly on the upper flange of the face string and be bolted in place with 3/8 inch round head cap screws spaced not over 2 ft. o.c. Upper channel shall be bolted to the newel post at each end with angle connections. Two 1/4 inch bolts shall be used in each leg of each connection angle. Size, height and spacing of balusters shall be as shown on the drawings. Level railing at the second floor shall be similar to those called for above with the lower channel resting on and secured to the curb with expansion bolts. Level rails shall be bolted to one-half newels at the walls. "Braun" mould #1245 shall be used as hand-rail for all railings called for above.

134 - RAILINGS:

This contractor shall furnish and install pipe railings at sides of exterior stairs or steps to vestibule and passage at sides of Gymnasium, at side of exterior steps to boiler room, at sides of area in front of window in boiler room, at the sides of the drive to the Agricultural Laboratory and at the front of the balcony in the Gymnasium; all as shown and indicated on plans.

All pipe railings shall be of 1-1/4 inch standard steel pipe with screw rail type fittings. Railings over concrete shall be secured in place by extending the vertical members into the concrete at least 8 inches and cementing them in place as the concrete is poured. Pipe shall be secured to walls in all cases by extending them at least 6

inches into the wall and cementing them in place. Posts of the railing in front of the balcony in the Gymnasium shall be secured to the channel at the floor with oval pipe flanges bolted in place.

All railings shall be installed plumb and in exact alignment with other work. All railings shall be securely installed and shall be free from movement of any kind.

135 - COAL CHUTES, CLEAN OUT DOORS, ETC.

This contractor shall furnish two coal chutes as indicated on the plans. Each of the coal chutes shall be style "A" No. M20 as manufactured by the Majestic Company of Huntington, Indiana. Doors, frames and hinges shall be of best quality malleable iron, all ground and closely fitted and made weather tight. Bodies and hoppers shall be of ten gauge copper bearing steel reinforced across the top with angles to support the wall above. Doors shall be equipped with automatic locks operated from inside only.

Clean-out door and frame shall be of cast iron. Frame shall have cast anchor lugs at corner extending 4 inches into the chimney. Door shall be 12" x 16".

136 - VAULT DOOR AND FRAME; LOCKERS:

This contractor shall furnish and install a #20 fire-proof vault door and frame as manufactured by the Schwab Safe Co. of Lafayette, Indiana. Outer door to be equipped with four horizontal and two vertical bolts of 1" cold drawn steel, all operated with a 4-tumbler combination lock. Vestibule to be of steel 18" deep, 25" wide and 74" high. Inner doors to be of steel with 2 vertical bolts controlled by a heavy key lock. Frame door, etc. shall be set with the door 1/2" above the floor. Space at sides, bottom and top shall be filled with 1 - 1 1/2 cement grout after door has been set level and plumb. Handles, hinge tips, lock dials, cross bolts, carrying bars, etc. to be N.P. Doors to be finished in dark olive green with gold striping. Frames also to be in olive green, and vestibule in light gray enamel. Lockers to be of steel and furnished and installed by others.

137 - MARQUISE:

This contractor shall furnish all metal supports for marquise at each east entrance. Chains shall be constructed of 1/2 inch sq. bar iron with 2-1/2 inch welded links. Chains shall be complete with solid hexagon sleeve turn buckles for adjusting slack. Chains shall be provided with anchors at top as indicated on the drawings. The anchors at the point where they enter the wall shall be covered with cast iron boss or escutcheon. The lower end of each chain shall be passed through the opening in the bent plate angle as indicated. The links of the chain shall be welded. The angle at the lower end of the chain shall be formed of 5/16 inch iron provided with 3 holes in each leg for attaching to the wood frame. Four 8" 6.54 lbs. J & L. beams 3'6" long shall be furnished to support the marquise to the wall. 4 holes shall be provided in each beam as indicated for attaching to wood frame.

138 - TOILET PARTITIONS:

This contractor shall furnish and install steel toilet partitions, shower and dressing room stalls for girls' toilet and toilet and shower stalls and screens for visiting team room and boys' locker and toilet rooms. Arrangement of stalls in each case shall be as indicated on the drawings. All partitions, posts, head rail, backs, utility end plates and covers shall be constructed of 16 gauge cold rolled copper bearing furniture steel. Partition panels shall have the sanitary "V" shaped moulding at top and bottom formed of the same sheet interlocked and welded to the post. All equipment shall be furnished complete with wall and top post fittings and cast brass fittings for the front of the post.

Doors shall be provided for all toilet stalls and shall be constructed with 3 inch stiles and rails of 18 gauge steel panels. Stiles and rails shall be mitred at corners, reinforced, electrically welded and finished flush. Openings to the shower compartments and to each of the dressing stalls in the girls' toilet shall be provided with curtain rails. Curtain rails shall not be provided in the visiting team room or in the boys' toilet and locker rooms. Doors, same as those called for above for toilet stalls shall be provided for the screens in the boys' locker and toilet rooms. All doors shall be complete with nickel plated brass coat hook, pull, slide bar latch, rubber tip bumpers at top and bottom and gravity hinges; all working parts of hinges to be completely enclosed.

All toilet stalls shall be provided with a pipe or utility space at the back as indicated on the drawings. Utility space shall be complete with end plates and covering. All enclosures of utility spaces, shower and dressing stalls shall extend to the floor. A 6" x 6" plain square vent grille shall be provided in the plates of the utility spaces at the back of each toilet compartment. Openings shall be provided in the cover plates to utility spaces for sheet metal vent ducts as indicated on the drawings; opening to be for the size of duct indicated. All steel parts of partitions, screens, etc. shall be primed at the factory with a gray metal primer. The remainder of the paint will be applied by others. All stalls, compartments, etc. shall be or be equal as approved by the Architect to those manufactured by Henry Weis Manufacturing Co., Inc.-Elkhart, Indiana.

139 - EXPANSION BOLTS:

In all cases, except where other methods are called for, all material shall be attached to concrete work or masonry walls with expansion bolts. Expansion bolts shall be or be equal as approved by the Architect to those made by the Ackerman-Johnson Company, 625 West Jackson Boulevard, Chicago, Illinois. Expansion bolts for use on exterior shall be of brass with brass and lead expansion elements.

140 - PAINTING:

All steel and iron work shall receive a shop coat of paint before leaving the factory or before being exposed to the weather. All surfaces which are to be in contact shall be painted before assembly.

In all cases the surface of the metal work shall be cleaned and in perfect condition when the paint is applied. Paint shall be applied only on warm, dry surfaces.

Metal shall be cleaned with a wire brush and benzine if necessary to remove oil, etc.

Paint for prime and first field coat shall consist of 100 lbs. pure sublimed blue lead, 4 gallons of pure raw linseed oil, 2 pints turpentine and not over one-half pint Japan drier.

Paint shall be applied evenly and uniformly over the entire surface. Paint shall be well brushed out to insure that no parts of the metal be left uncoated and that the paint will not be left in drops to peel off.

Remainder of painting shall be taken care of by the Painting sub-contractor.

141 - CLEARING SITE:

This contractor shall leave all work installed by him clean and perfect in every respect and upon completion of his work shall immediately remove all his surplus material, equipment, debris, etc. from the premises.

142 - GUARANTEE:

All work installed under this contract which shows defects within one year from date of acceptance shall be removed and replaced by this contractor without additional cost to the Owner. All work so replaced must be in strict accordance with the plans and specifications.

CARPENTRY AND MILLWORK

143 - GENERAL CONDITIONS:

The "General Conditions" pages 1 to 15 inclusive, apply to all contracts and form a part of and are included with these specifications for "Carpentry and Millwork".

144 - SCOPE OF THE CONTRACT:

This contract shall include the furnishing and installing of all permanent and temporary woodwork of every description required for the completion of this building, including all lumber, sheathing, temporary bracing, grounds furring, nailing strips, screeds, water proofing, flooring, mill work, cabinet work, window and door frames, sash, doors, blackboards, bulletin boards, rough hardware, and such other work as indicated on the drawings or herein-after specified.

145 - DRAWINGS AND SPECIFICATIONS:

General Drawings, Large Scale Drawings, and Specifications shall be closely followed. Full size details will be furnished for such work as required. Exact measurements for all work must be secured at the building.

146 - MEASUREMENTS:

This contractor shall be responsible for the correctness of all lines and levels and shall check all existing work with which his work comes in contact and report all discrepancies to the Architect for correction. He shall locate all doors, openings, windows, etc. according to the dimensions given on the drawings.

147 - TEMPORARY SANITARY CONVENIENCE:

This contractor shall build and maintain a temporary toilet where directed by the Architect, using 7/8 inch x 5 1/2 inch M. & D. supported on 2 inch x 4 inch frame for walls, floor and roof. Roof shall be covered with roofing paper in a manner as to render the building water tight. Provide doors, seats, stalls, etc. for the use of all workmen on the building.

148 - SHOP DRAWINGS:

Shop drawings of all millwork shall be submitted for approval in advance of the work. Particular attention shall be given to construction joints and the general

method of assembling and all of these shall be very clearly shown or indicated by the shop drawings.

This contractor shall secure exact measurements at the building for all work that is to be assembled at the shop.

149 - MATERIALS AND WORKMANSHIP:

All lumber shall be new and the best of the class and grade specified and all shall be entirely free from shakes, sap, loose knots, dry rot or anything that will injure its durability.

All lumber is to be grade marked and is to be thoroughly seasoned to a proper state for the various purposes for which it is to be used. All lumber shall be kiln dried if necessary to reduce the moisture content to not more than 11%. Material shall be protected at the site to prevent damage from the elements and other causes.

All lumber, unless otherwise noted, shall conform to the following grades:

Screeds, bucks and all sheathing shall be No. 2 common Y.P. Lumber for forms may be used sheathing. Grounds, nailing strips, etc. shall be No. 1 common W.P. Door frames, window frames, sash, exterior trim, etc. shall be clear - red heart cypress, or redwood of the same grade. All material for flooring, cabinet work, and interior trim shall be as hereinafter specified.

The work is to be executed in the best workman-like manner according to the true intent and meaning of these specifications, the accompanying drawings and details.

150 - CENTERS, TEMPORARY SUPPORTS, ETC.

This contractor shall furnish and install all wood centers required for masonry work. Centers shall be substantially constructed, accurately fitted to the work, and supported and rigidly braced in such manner as to carry all loads without settlement until masonry has set. This contractor shall also furnish and set all centers, temporary plates, etc. All centers and temporary supports shall be removed after the work they support has received its full load and has attained sufficient strength to support itself.

151 - PROTECTION OF FINISHED WORK:

All cut stone work including carving, pier caps, belt courses, etc. and all steps, brick sills, and other work liable to damage of any kind shall be properly protected by boards, box paper, etc. as required to prevent damage.

All finished floors, stairways, and landings are to be thoroughly protected from injury of any kind.

All protection must be retained until the building is completed or directed removed by the Architect.

152 - CUTTING AND FITTING:

This sub-contractor shall co-operate with all other sub-contractors in the installation of his work and shall do all cutting and fitting required in cabinet and mill-work for the installation of other work.

153 - TEMPORARY CLOSINGS:

This contractor shall close all exterior doors with temporary doors and sash and all other openings in exterior walls with heavy muslin for the protection of the interior of the building while plaster is being applied and is drying, and shall maintain and keep all closings in repair. Permanent sash shall not be installed until all plastering has been completed and dried.

154 - BUCKS:

This contractor shall lay out all lines for interior partitions throughout the building. All partitions, except as otherwise shown or called for, shall be of masonry as hereinbefore specified. This contractor shall furnish and install wood bucks in all openings in exterior walls where called for by the details or hereinafter specified. Bucks in all cases shall be 1-3/4 inch thick and of same width as rough wall in which they are installed. All bucks shall extend in single lengths, and full height and width of the openings. Bucks shall rest upon and be anchored to the concrete slab with 5/8 inch dowels extending at least two inches into the concrete and the same distance up into the buck. All bucks shall be set plumb, straight and true. Bucks shall be slightly larger than the finished frame to permit more accurate plumbing and adjustment but shall be of such size that the casing, as detailed, will lap the plaster at the sides of the buck at least 1/2 inch.

Bucks shall be anchored to the masonry walls with No. 10 wire or sheet metal anchors spaced not over 2 ft. o.c. throughout the height of the buck. The wire or sheet metal anchors shall extend at least 12 inches into the masonry joint. Sheet metal anchors, if used, shall be of 26 ga. galvanized iron and shall be approximately 1/2 inch less in width than the masonry wall in which they are used. Each anchor shall be nailed in place with at least three cement coated 6d nails.

155 - FURRING GROUNDS AND NAILING STRIPS:

This contractor shall furnish and install all wood furring, grounds and nailing strips of every description shown or required throughout the building, both interior and exterior to secure trim, cabinet work, cases, cornice, etc. Grounds of the proper thickness shall be placed back of all trim, around all openings, etc. to receive the plaster. Grounds shall be securely fastened to the masonry by nailing into special nailing brick at intervals not to exceed 24". Brick to which grounds are nailed shall be built in as a part of the masonry walls. All grounds must be straight, true and plumb. Grounds about openings shall be erected in such manner as to provide for at least 5/8 inch of plaster and to make jambs of uniform width. Grounds about openings shall be nailed to bucks so that the trim shall lap the plaster approximately 1/2 inch.

All nailing strips, grounds and furring shall be solidly and substantially secured in place to permanently support the materials which are to be attached to them. The requirements which are herein described are the minimum and additional materials shall be furnished and installed if required to properly secure the finished work.

156 - FRAMING AND SCREEDS:

This contractor shall furnish and install all wood framing at the front of the stage, for the balcony, etc. All framing shall be of two inch lumber and installed as indicated on the drawings.

Screeds for wood floors in the gymnasium, stage and dressing rooms shall be of 1-5/8 inch x 3-5/8 inch lumber as hereinbefore specified. Screeds shall be spaced 16 in. o.c. Screeds shall be installed level, straight and true to a line and shall be anchored to the concrete floors with No. 10, soft annealed, galvanized wire at intervals not to exceed 3 feet throughout the length of each screed. This contractor shall furnish and install the wire anchors

for screeds at the time the concrete slabs are being poured. Wire shall extend to a depth of two inches below the surface of the concrete slab. Screeds shall be installed east and west, that is, so that the finished wood flooring shall extend the long way of the rooms. Screeds shall be installed at the side of each partition, about each opening and along the east and west walls, forming a complete support for the wood flooring.

157 - WATERPROOFING:

The concrete slab where screeds are installed shall be primed with an asphalt primer and given a mopped coat of hot asphalt before the screeds are applied.

158 - SHEATHING:

This contract shall furnish and install a sub-floor of $7/8 \times 5\frac{1}{2}$ sq. edge No. 2 Y. P. boards over the screeds in the Gymnasium. Sub-floor shall be laid diagonally with the ends of all boards matched over the screeds. Boards shall be secured in place with two 8d nails at each support. Sub-floor will not be required on the stage or in the dressing rooms. Sub-flooring shall be seasoned and dried as hereinbefore specified in Article No. 149. Form lumber, cleaned and dried as above, may be used for sheathing

159 - WINDOW FRAMES AND EXTERIOR DOOR FRAMES:

All window frames and exterior door frames throughout the building shall be of wood as hereinbefore specified.

All frames shall be made in strict conformity with scale and full size details.

All exposed parts of double hung window frames including pulley stiles and parting stops shall be built of clear red cypress or red wood. Backs of frames shall be of No. 1 common yellow pine. Pendulum strips shall be of 22 gauge galvanized iron. Pendulum strips shall extend full length of frames and be anchored at top and bottom.

All sills shall be saw kerfed to prevent warping and shall have a groove cut to receive the calking. Jambs and mullions shall be mortised into heads and sills. Transoms shall be mortised into jambs.

Double hung window frames shall be fitted with pulleys as manufactured by the Anderson Foundry Company of Bayport, Minn. Pulleys to be No. 201 with $1-1/8"$ x $5-1/2"$ plate and $2-1/4"$ wheel. Face plate to be polished and remainder of pulley lacquered.

Blind stops and jambs of window frames shall be 1-1/8 inches thick. All jambs for door frames shall be 1-3/4" thick, rabbeted for door and screen as shown.

Contractor shall set all frames plumb, straight, and in perfect alignment with adjacent work and shall brace them securely until enclosed by the masonry.

Grooves for calking shall be filled with "Vulcatex" as manufactured by the A. C. Horn Company and crowded down against the brick sills.

Exterior frames shall be anchored to masonry with anchors as hereinafter specified, screwed to frames and built into the wall; anchors to be used at center of each window jamb and on door jambs at 2'6" o.c.

Staff beads shall be attached to frames in a temporary manner until frames have been calked as hereinafter specified.

Frames of double hung windows shall have finished blocks in sash slide of side jambs at top to prevent lower sash from hitting head.

160 - SASH:

All exterior sash throughout the building shall be made of clear, thoroughly seasoned kiln dried redwood, free from sap and other imperfections. All sash shall be 1-3/4 inch thick and shall be assembled with mortised and tenoned joints; using through tenons in all cases. Joints shall be securely wedged and glued together. Sash shall be moulded and rabbeted to receive glass as detailed. The meeting rails shall be beveled and rabbeted to fit closely. Sash shall be dipped in hot linseed oil at the shop before glazing.

161 - GLASS SIZES:

This contractor shall furnish to the glass sub-contractor at the earliest possible time, a complete schedule of accurate glass sizes for all doors and windows throughout the building, so that the glass contractor can place his order without delay.

162 - MARQUISE:

This contractor shall furnish and install all wood framing for marquise at each east entrance. All woodwork for marquise shall be of No. 1 yellow pine, properly sea-

soned and dried as hereinbefore specified in Article No. 149. Outer frame shall consist of two 2 x 8's securely spiked together, bolted to steel angles at corners, to steel beams at walls, and framed to wood muntins at intervals all as shown and detailed. Framing and sheathing with box for gutter shall also be installed at wall as shown. Sheathing for marquise shall be of 7/8" x 5 1/4" No. 1 D. & M. Yellow Pine.

163 - ROUGH HARDWARE:

This contractor shall furnish and install all rough hardware required for the installation of his work, including all nails, screws, spikes, bolts, washers, buck and frame anchors, sash weights, etc.

He shall also furnish and install all sash chain, stop screws for window and door stops, etc.

Sash chain shall be of equal as approved by the Architect to Giant Metal as manufactured by the Smith and Egge Manufacturing Company of Bridgeport, Conn.

Stop screws for window and door stops shall be of bronze similar to Corbin's #182 1/2. Stop screws shall be spaced not over 15 inches o.c.

Anchors for bucks and frames shall be of 3/16 inch x 1 inch iron - two inch bend at one end in masonry, two inch bend at other end secured to frames with two 1 1/4 inch screws and 8 inches between bends.

164 - CALKING:

Before the masonry and stonework has been cleaned down, this contractor shall remove the staff mould and calk around all frames with oakum, driving it well into the joints and making them absolutely air and water tight and finishing the joints with an elastic waterproof calking cement.

After calking has been completed, the staff beads shall be replaced. They shall be closely and accurately fitted to frames and to the masonry. In all cases where the staff beads do not fit closely against the masonry, the open spaces shall be filled with calking cement. Staff beads shall be secured in place with 10d finish nails spaced not more than 12 inches o.c. All nails in finish work shall be countersunk to a depth of 1/16 inch.

Calking cement shall be or be equal as approved by the Architect to "Vulcatex" as manufactured by the A. C. Horn Company of Long Island City, N.Y.

Care shall be exercised in this work not to damage the masonry or frames.

165 - INSULATION:

No insulation will be required under this contract. Roof insulation only will be used - furnished and installed by others.

166 - WEATHERSTRIPPING AND SCREENS:

Weatherstrips and screens will not be included in this contract. Window and door frames will be constructed as detailed to receive screens. Special care shall be exercised in fitting sash, exterior doors, etc. to avoid unnecessary play as weatherstrips will not be installed.

167 - CARE OF MILLWORK:

This contractor shall provide a clean, warm, dry place for storing millwork after delivery and shall be responsible for it until after all work is completed. No interior wood finish shall be delivered or installed at the building until all plastering is completed and the building perfectly dry.

168 - PRIMING AND BACK PAINTING:

The back of all door and window frames that are to be installed in exterior walls shall be primed on all sides before shipping from the mill. All interior trim and cabinet work shall be painted on the back before shipment. Prime coat for exterior work shall consist of one coat of white lead and linseed oil paint. The back of all trim and cabinet work shall be given two coats of white lead and linseed oil paint. The Architect shall be notified before any work is primed in order that it may be properly inspected by him. All materials for priming and back painting shall be as hereinafter specified under painting for this type of work. The backs of all sash shall be primed after the fitting.

169 - WOOD FLOORS:

This contractor shall furnish and install wood floors in the Gymnasium, including balcony, dressing rooms and stage. Floor in Gymnasium shall be of first grade Northern hard maple, 25/32 in. thick x 2-1/4 in. face. Flooring shall vary in length from two to sixteen feet and contain up to 25 percent of 2 to 3 1/2 ft. lengths, all in accordance with the standards of the Maple Flooring Manufacturer's Association. The flooring may vary slightly in color but shall be of uniform quality throughout. All flooring shall be both side and end matched.

Flooring in balcony, dressing rooms and stage shall be of edge grain "B and Better" grade of Arkansas soft pine. Flooring shall be both side and end matched. An asphalt coated roofing felt weighing 30 lbs. per 100 sq. ft. shall be installed over the sub-floor of the Gymnasium and over the screeds in the stage and dressing rooms before finish flooring is applied. Felt shall be lapped at least three inches at all sides and ends and made continuous over the entire surface. Flooring shall be carefully laid, drawn up tight and securely nailed with 8d nails in each screed, or where sub-floor is used at intervals not to exceed 8 inches. Joints between the ends of boards shall be separated at least 8 inches from those in the next two courses back.

Floor in Gymnasium shall be cut true and square to a line 5/8 inch from all walls and from other floors where doors occur. Floors on the stage shall be fitted closely to the walls and to the finish about foot lights in front of stage. Flooring on stage shall extend through and be installed as a part of the floor in the dressing rooms. Floor in dressing rooms shall also be fitted closely to the walls on all sides. Floor in balcony shall be installed in the same manner as that called for above for the stage with ends closely fitted to the walls, risers, etc. Risers shall also be made of the same material as the floor. Flooring in the balcony shall extend over the risers in each case approximately 1/4 inch. Exposed edge of flooring shall be dressed smooth with the corners slightly chamfered.

All flooring shall be sanded to a true, even surface, removing only sufficient wood to accomplish this. Flooring shall be protected with paper and barricades, etc. until the painters' finish has been applied and the building completed.

170 - INTERIOR TRIM:

except where otherwise noted
All interior trim throughout the building shall be of clear, plain sawed red oak. All wood for interior finish shall be thoroughly seasoned, kiln dried stock, with the moisture reduced to not to exceed nine percent. All finish shall be redried in the kiln immediately before fabrication is started. All trim shall be made in accordance with scale and full size details. The extent of the trim in all rooms shall be as determined from the schedules, details and drawings. All trim shall be fitted and assembled at the building. All joints shall be made with hair line joints and secured with nails concealed in angles and offsets as far as possible. Finish nails only shall be used for securing interior finish, except window and door stops which will be secured with screws. Nails shall be set to a uniform depth of 1/16 inch. Window and door trim shall be installed without joints except at

angles. All other trim - baseboard, blackboard trim, chair rail, picture mould, etc. shall be furnished and installed in as long lengths as possible. Where splices are required the joints shall be carefully sanded and smoothed to make the joints as inconspicuous as possible. All trim shall be installed with housed or coved joints in interior angles instead of mitres. Trim in basement and toilet rooms shall be of clear Yellow Pine.

171 - CABINET WORK:

This contractor shall furnish and install cabinets as shown and detailed on the drawings for the kitchen and trophy case in the first floor corridor. Case shall be constructed at the mill in as large sections as can be conveniently handled and shall be the highest class of this type of cabinet work.

All cases in the kitchen shall be constructed as detailed. Tops of the lower sections of wood cabinets, doors, drawer fronts and frames shall be 1 1/8 inch thick. Doors shall be constructed of selected, clear, straight stock. Panels of doors and ends of cabinets, where shown, shall be of 5/16 inch veneering. Doors and frames of cabinets shall be framed together with mortise and tenon joints. Panels shall be installed in grooved in the doors or ends of cases as shown at the time the work is fabricated. All exposed parts of cabinets shall be of oak as hereinbefore specified for trim, except the top of the lower sections, which shall be of clear maple. Shelves shall be of yellow pine and will not be adjustable, will be formed into the end sections and provided with supports at the back as noted. The end sections or jambs shall be attached to a 7/8" x 1 1/8" strip, plowed in. Cases shall be attached to the walls with screws through the above mentioned 7/8" x 1 1/8" strip and by bolts at the top set in the concrete work at the time of pouring, or attached to the steel framing.

All cases, including the trophy case shall be furnished without backs and set against the plastered wall. Trophy case shall be complete with wood jambs, trim, and plate glass doors without frames. Jambs shall be rabbeted as indicated on the drawings to receive the plate glass doors. The plate glass doors for the trophy case will be furnished by the glazing sub-contractor but installed as a part of this contract.

172 - DOORS:

All doors throughout the building, except those for the trophy case shall be of wood furnished and installed as a part of this contract. All exterior doors shall be of cypress or redwood as hereinbefore specified for sash. Size, thickness, arrangement of panels, glazing, etc. of doors, unless otherwise noted shall be as called for on the drawings. All doors except those called for above for the exterior shall be of the same kind of wood as the trim of the rooms in which they occur.

Panels for exterior doors shall have raised centers and be fabricated of a single thickness of wood as called for above for the remainder of the doors. Panels of interior doors shall be of five-ply flat cross banded veneering. Panels for exterior doors shall have a net thickness of 3/4 inch at the center. Mouldings or strikings of doors and muntins shall be as detailed.

Interior doors shall be veneered over selected soft wood cores. The cots of all doors shall be of thoroughly seasoned, kiln dried stock securely glued together and framed with close fitting mortise and tenon joints. Veneer on stiles and rails shall be 1/8" thick. Panels shall be constructed as indicated. Doors shall be veneered on edges with 3/4 inch thick beveled strips. All exposed wood of doors shall be of same material as trim of room in which doors occur.

Doors in pairs shall be rabbeted - without astragals. Doors shall be rabbeted for glass as called for on the drawings. Glass shall be secured in place with wood stops.

Cabinet doors shall be of type and constructed as called for above in Article No. 171.

All doors shall be carefully hung, neatly and closely fitted without unnecessary play for satisfactory operation.

173 - BLACKBOARDS:

This contractor shall furnish and install Natural Slate Blackboards on walls of rooms where indicated on plan and in accordance with scale and full size details.

On all walls where blackboards occur, the trim over the bulletin boards shall run within 4 inches of corners and trim of openings. The heights of the slate and the distance of the chalk tray from the finish floor shall be as called for by details.

The slate shall be of the finest quality selected blackboard stock, even in color, free from veins or imperfections and not less than 1/4 inch nor more than 3/8 inch thick. Each piece shall be surfaced in accordance with the Natural Slate Blackboard Company's standards and shall be branded with the "Pyramid" trade mark.

All spaces to be divided into pieces as nearly 4'6" long as space and standard lengths permit. Slate shall be furnished with joints ground straight, true and neatly fitted. The carpentry contractor will furnish and set all grounds and will set all blackboards complete with trim.

Fasten securely to the wall, kiln dried white pine ground strips of sizes required at top, bottom and ends of all spaces to be occupied by blackboards. Back of all joints in slate securely place 2" x 1/2" white pine strips and when blackboards are being set tap wood wedged behind slate and glue and sprig the wedges to these uprights.

Slate shall also be attached to walls with spots of Plaster of Paris spaced not over 18" o.c. in each direction. Space between wedges at joints shall also be filled with Plaster of Paris.

To the ground strips above mentioned securely set trim as called for on full size details.

At bottom of blackboards place countersunk chalk troughs as per detail, carefully leveled, extending under blackboards to face of wall and securely nailed to ground strips and to aprons with molds as detailed. Chalk rails shall be molded on all exposed edges and extended under bulletin boards as indicated.

Each piece of slate shall be braced temporarily until all the pieces of each section are in place. The blackboard nolds shall then be installed securely holding the slate to grounds, trim and chalk trough.

The joints between slate shall, after being wedged as before specified, be made tight with special glue or jointing compound, which shall be furnished with the slate, and after completion of setting, joints shall be scraped and shaved to a smooth plane with adjoining surfaces.

All slate blackboards shall be left sound, clean, black, ready for use and in every way a complete and satisfactory installation.

174 - BULLETIN BOARDS:

This contractor shall furnish and install cork bulletin or tack boards in sides and top of each section of blackboards in class rooms and shall furnish and install bulletin boards in corridors as indicated on the drawings. The cork board at sides and top of the blackboard shall be 18 inches wide and installed over grounds placed at edges and extending throughout the center the long way of the strips. The trim about the cork board shall be installed as a part of that about the blackboards. Each section of cork board shall be molded in place separately. Sections shall be arranged symmetrically and be uniform in size. The bulletin boards in the corridor shall be 6 ft. wide and 4 ft. high. Ground strips shall be placed at the edges and at 12 inch centers one way throughout the center of each sheet. Grounds in all cases, shall be carefully leveled and brought to an exact surface. Trim about bulletin boards in the corridor shall be similar to that about the slate blackboards and bulletin boards in the class rooms except that chalk rail trough shall not be required in the corridor. All cork boards shall be securely nailed at the edges before the moulding is placed. Care shall be exercised in nailing the cork board to place the nails in such position that they will be covered by the moulding. Cork boards shall be or be equal as approved by the Architect to Armstrongs' cork board as manufactured by the Armstrong Cork Company.

175 - SCUTTLE:

This contractor shall furnish and install all wood work required in the installation of a scuttle from the ceiling of the second floor corridor to the roof as indicated on the drawings. Scuttle shall be complete with a one panel door, jamb and trim at the ceiling; 2 x 12 solid frame with 7/8" box door cover at roof and ceiled sides between ceiling and roof. He shall also install scuttles to storage over dressing rooms.

Clear opening of scuttle shall be approximately 2'-0" x 2'-6". The lower door shall be 1-1/8 inch thick and shall be complete with stops, etc. The upper door shall be provided with a 2" apron extending down over the 2 x 12 frame or curb. Lower doors, trim and frames only will be required for scuttle to storage.

176 - STAIRS:

All stairs throughout the building will be of steel or concrete. No finish wood work will be required for them. Steps from Gymnasium to stage, however, shall be of

wood carriages over an inclined concrete slab. Carriages shall be of 1-5/8" material 3" deep at least section spaced 16" o.c. forming a complete support for wood treads. Carriages shall be securely nailed to screeds at top and bottom. Treads shall be of maple 1-1/8 inch thick. Risers and carriages shall be of oak 7/8 inch thick. Carriages shall be housed to receive treads and risers. Risers shall be housed to receive treads. All shall be assembled with glued wedged and nailed joints.

108 - 4 - GANT STRIPS, CURBS, ETC.

This contractor shall furnish and install cant strips of dimensionally riped 4 x 4 timbers at intersections of roof with all vertical surfaces. Each section of cant strip shall be securely nailed and anchored in place.

He shall also furnish and install 2 x 12 curbs for eave and ventilator; curbs to be well nailed together and securely anchored to the roof construction.

177 - WOOD PARTITIONS:

This contractor shall furnish and install 1-3/4" thick wood partitions between rooms No. 202 and 203. Partitions shall be of the same material as hereinbefore specified for other interior finish and shall be complete with paneled wainscoting approximately 3 ft. 6 in. high with one section of glass over it and another section of wood panels extending from the glass to the ceiling. A door of the same type as shown for the class rooms shall be installed at the location indicated on the drawings. The wood panels shall be the same as those hereinbefore specified for doors. The glass shall be in section the same width as the wood panels and shall be secured in place with mouldings similar to those used for securing the wood panels. Mouldings shall be provided at the top to close the space required for setting. Plain strips approximately 1/2 inch thick shall be provided on each side to close the space required for fitting at the ends. Transom bar shall be provided directly over the door, extending the full length of the partition to insure the proper rigidity. A 12 x 16 inch grille shall be furnished and installed in wood panels near the center of the partition to provide ventilation between the two rooms. The grilles shall be of 14 gauge pressed steel and of plain lattice type with 3/4 inch square openings. Grilles shall be moulded in place and shall be finished with a prime coat of paint, only.

A wood partition will also be required at the end and back of the group of drawers in the Domestic Arts Room. This partition shall extend from the floor to a height of approximately seven ft. and shall be attached to and supported by the supply drawers which will be furnished by the Owner. Partition shall be composed of a frame work 1-3/4 inches thick with wood panels as hereinbefore specified for doors. Arrangement of panels shall be as indicated. Panels shall be moulded in place similar to those in the doors. Partition shall be finished at the top with 1-3/4 inch thick cap with a small bed mould on either side. Partition shall be secured to floor and to wall with concealed expansion or stair bolts.

178 - RAILINGS:

This contractor shall furnish and install railings in room #207 between the Library and stair hall. Railing shall be complete with newel post, hand rail, baluster, lower rail, etc. Hand rail shall be approximately 1-3/4 x 4", rabbeted to receive balusters. Balusters shall be turned from 1-3/4 inch stock spaced approximately 5 inches

c.c. Bottom rail shall be approximately 1-3/4" x 3". Newel posts shall be approximately 4-1/2 inches square, paneled on all sides. Posts shall be without caps but neatly rounded on top. Both top and bottom rail shall be securely fastened to newel posts with counter sunk finish nails and stair bolts. Bottom rail shall also be supported from the floor at intervals of approximately 5 ft. Newel posts shall be attached with 3" x 3 1/2" x 1/4" x 4" angles bolted to either side of each newel post and to the floor. Expansion bolts, as called for in Article No. 139 shall be used for attaching the angles to the floor. Round head bolts with nuts inside the post shall be used for attaching the angles to the post.

179 - SHELVING, HOOK STRIPS, ETC.

This contractor shall furnish and install all shelving and hook strips in closets 109-A and 205-B. He shall also install all shelving in the library in room #207. All shelving shall be approximately 12 inches wide and 7/8 inch thick. Hook strips shall be approximately 3 inches wide and 7/8 inch thick. Closet No. 109-A shall be equipped with 6 shelves of the width called for above spaced approximately 12 inches o.c. Room 205-B shall have a single shelf only across each end. Room 109-A and 205-B shall have two rows of hook strips extending entirely around the room. Shelves in room 109-A shall be supported on 2 inch square upright on the corner and with 1 x 2 upright at each end of the shelving. 1 x 2 strips shall also be attached to the walls to support the back of each shelf in room #109-A. Shelving in 205-B shall be supported on the upper hook strip. The lower hook strip in 109-A and 205-B shall be set 4 ft. 6 in. above the floor. The upper strip shall be set one ft. higher. The shelving in the Library in room No. 207 shall be of the same width and thickness as that called for above and installed as shown on the drawings. The lower shelf in room No. 207 and in 109-A shall, in each case, be 4 inches above the floor. Shelves and hook strips in 109-A and 205-B shall be of yellow pine. Shelves in Library shall also be of yellow pine but faced with 1-1/2" x 7/8" strip of oak.

180 - COUNTER:

This contractor shall furnish and install counter as indicated in the ticket office or vestibule to the Gymnasium. Counter shall be complete with 16 x 1-1/8" top, paneled front, hinged section at top, etc. The front shall consist of 1-1/8 inch frame with 3/8 inch panels plowed in. Counter shall have a frame work of 2 x 4's securely framed together and anchored to floor with expansion bolts. A single 12"

shelf shall be provided in the counter extending from the gate to the opposite wall. All parts of counter, except frame work and lower shelf shall be of oak as specified for interior trim.

181 - INSTALLATION OF FINISH HARDWARE:

All finish hardware required to complete the building will be furnished by the Owner and delivered at the building to this sub-contractor when required. The carpenter shall install all hardware in a neat and workmanlike manner, employing for this work none but the most skillful mechanics.

All hardware shall be left at the completion of the building absolutely free from tool marks or defects of any kind and in perfect working order. The contractor shall receipt for finish hardware on its delivery to him at the building and after receipt thereof shall assume all responsibility for it until the building is accepted by the Owner.

182 - CLEARING SITE:

This contractor shall leave all work installed by him clean and perfect in every respect and upon completion of his work shall immediately remove all his surplus material, equipment, debris, etc. from the premises.

183 - GUARANTEE:

All work installed under this contract which shows defects within one year from date of acceptance shall be removed and replaced by this contractor without additional cost to the Owner. All work so replaced must be in strict accordance with the plans and specifications.

LATHING AND PLASTERING

184 - GENERAL CONDITIONS

The "General Conditions", pages 1 to 15 inclusive, apply to all contracts and form a part of and are included with these specifications for Lathing and Plastering

185 - SCOPE OF THE CONTRACT:

This contract shall include the furnishing and applying of all material for lathing and plastering throughout the building as required by the drawings and these specifications.

All walls, ceilings and soffit surfaces throughout the first and second floors shall be plastered except that the Gymnasium, stage, dressing rooms, the ticket office at the side of the Gymnasium, and the storage rooms over the dressing rooms will be left with the Haydite blocks exposed. No plaster will be required in the basement except on the underside of the stairs from the first to second floor. The extent of plastering shall also be as called for on the schedules and drawings and as hereinafter specified. Ceiling only of ticket office shall be plastered.

186 - STANDARDS:

All material - lath, plaster, cement, lime, sand, etc. shall be in strict accordance with the standard specifications of the American Society for Testing Materials.

187 - MATERIALS:

Plaster for Brown coat shall be "Red-top" Gypsum plaster as manufactured by the United States Gypsum Company.

Bond Plaster shall be "Bondcrete" as manufactured by the U. S. Gypsum Company.

Portland Cement shall be as hereinafter specified for concrete work.

Plaster of Paris shall be "Albatross" or equal.

Keene Cement shall be Best Brothers as manufactured by the Best Brothers Keene Cement Company, Medicine Lodge, Kansas.

Lime Putty shall be prepared from freshly burned lump lime slacked with cold water and screened through a 1/8" mesh screen into a settling box or lined pit where it shall age for not less than twenty days before using.

Hydrated lime shall be as specified for masonry.

Lath shall be 24 ga. expanded metal weighing not less than 3.4 lbs. per sq. yd. All lath shall be dipped in asphaltum before shipping.

Furring Channels: Cold or hot rolled furring channels $1\frac{1}{2}$ " in depth shall weigh not less than 442 lbs. per 1000 lin. ft. 1 inch furring channels shall weigh not less than 276 lbs. Furring channels shall be coated with asphaltum before shipment.

Corner Beads shall be of the expanded metal type as manufactured by the Milwaukee Corrugating Company.

Sand shall be clean, sharp, properly graded and of the proper size for plastering. Sand shall be thoroughly washed and be free from an injurious amount of organic matter and not over two percent of clay by weight.

188 - WORKMANSHIP:

All work executed under this contract shall be done by mechanics skilled in their respective trades and all workmanship shall be first class in every respect.

189 - SCAFFOLDING AND EQUIPMENT:

This contractor shall furnish and maintain all of the scaffolding, runways, and similar work necessary for the execution of this work. He shall also furnish all mixing boxes, settling boxes, or tanks, mortar boards, tools, etc. Scaffolding and other equipment shall interfere as little as possible with the work of other contractors and be removed promptly when the work is completed. Care shall be exercised in the placing, removal and handling of scaffolding and equipment to avoid damage to any part of the building.

Mixing boxes, mortar boards, tools, settling tanks, etc. shall be clean and in good condition at all times.

190 - INSPECTION:

Before starting lathing or plastering this contractor shall inspect the building to see that walls, partitions, ceilings, etc. are square, true, even and plumb, that grounds are of proper thickness, in good condition and set as required by the drawings. Any error or discrepancy shall be reported to the Architect for Adjustment.

191 - GROUNDING:

All necessary wood grounds will be provided by the carpentry contractor as hereinbefore specified. The lathing and plastering contractor shall verify all grounds to see that they are built perfectly true, straight, plumb or level as required before plastering is begun. This, the lathing and plastering contractor shall be held responsible for any imperfect work in the grounds, etc. after the plastering is begun.

All grounds for beams, beads, etc. shall be furnished and placed by this contractor.

192 - CHECKING AND LAYING OUT THE WORK:

This contractor shall carefully check all pipe installations, beams, girders, openings, etc. throughout the building before forming furring for plaster ceilings, etc. to make sure his work can be installed as shown. Any discrepancies or errors found which interfere with this work shall be immediately reported to the Architect for adjustment.

193 - METAL FURRING AND SUSPENDED CEILINGS:

Suspended plastered ceilings will be required in all rooms on the first and second floors except the east entrance vestibules, the gymnasium, stage, dressing rooms and storage rooms (over dressing rooms).

Suspended ceilings in all rooms on the first floor except those noted above shall be supported on 1" furring channels spaced 12" o.c. The furring channels in these rooms shall be installed directly against the lower side of the joists. In all rooms and corridors on the second floor, the ceilings shall be suspended below the roof framing. The furring on the second floor shall consist of 1½" runner channels spaced 4'0" o.c. in opposite direction of the joists above them and ¾" furring channels spaced 12" c.c. All 1st. floor corridors will have suspended ceilings same as 2nd floor. The 1" furring channels and the 1½" runner channels shall be supported at the side of each joist with 1/4" ϕ mild steel rods. Rods shall be placed in position through the forms before the concrete is poured. Rods shall be looped and hooked over reinforcing steel. Rods shall be of sufficient length that lower end may be wrapped around the 1" or 1½" channels twice and tied at top.

The ¾" furring channels shall be secured to the 1½" runner channels with soft, annealed #12 galvanized wire. Each connection shall be made with five strands of wire drawn tightly and the ends twisted together.

The ends of all furring channels shall extend into and be supported on the masonry walls. Openings about channels at walls shall be filled with Portland cement mortar.

All furring and runner channels shall be installed in such manner that the webs of the channels will be maintained normal to face of plaster. All beams, girders and columns in plastered rooms shall be furred.

Typical furring members shall consist of 3/4" channel 12" o.c. with end members, bridging, stiffeners, etc. formed of 1 1/2" channels approximately 4'0" o.c. or as required or shown. Runner and furring channels shall be wired together at every intersection same as specified for suspended ceiling work, and runner channels shall be securely and substantially anchored in a manner as approved by the Architect. Special furring shall be furnished and installed in accordance with detail drawings as indicated. Metal furring members on soffits of steel stairs shall be securely wired to structural supports of stairs, holes being left in the lath for this purpose.

All furring shall be formed and placed accurately, plumb, level or inclined as directed, and true so that the plaster will have firm and substantial foundation and will not crack, and so that all profiles, lines, corners, inclined ceilings, etc. can be formed as shown on the drawings.

194 - FURRING PIPES AND DUCTS:

Contractor shall furr and plaster over all plumbing pipes, ventilating ducts, etc. where indicated in order to conceal them. Heating risers will be exposed.

195 - LATHING:

Metal lath, as hereinbefore specified, shall be secured to all furring members with 18 ga. galvanized soft annealed wire at intervals not to exceed 6". Lath shall be lapped 1" at sides and 2" at ends. Sheets shall be securely laced together with 18 ga. wire as called for above for tying where laps occur between supports. Wire shall be wrapped twice, drawn tight and the ends closely twisted for each tie.

Lath shall lap all adjoining masonry walls at least 4" and be nailed to the walls with large head 4d galvanized roofing nails spaced approximately 6" o.c. Lath shall be applied over columns, chases, etc. with edges lapped over the masonry walls and nailed as called for above.

196 - METAL CORNER BEADS:

All external vertical angles throughout the entire building where plastering is called for shall be provided with metal corner beads as hereinbefore specified. Beads shall be nailed to the masonry as specified for lath which laps masonry walls, or tied to the lath (where lath occurs) with ties spaces not over 12" o.c. Ties shall be made as called for above for securing lath to furring members.

197 - PLASTER BOND:

This contractor shall apply a scratch coat of bond plaster as hereinbefore called for to all concrete surface (except Haydite Concrete) which are to be plastered. Bond plaster shall be applied in strict accordance with the manufacturers' directions, shall be brought to exact lines required and then broomed or scored lightly to furnish key for following coat.

198 - PLASTERING BEAMS, COLUMNS, OVER PIPES, ETC..

All beams, columns, furring over pipes, etc. projecting below ceilings or beyond face of walls in rooms where plaster is called for shall be plastered square, level, plumb and true.

199 - PLASTERING:

All plastering throughout shall be done with materials as hereinbefore specified, mixed and applied in exact accordance with directions and specifications of the manufacturers. Plaster shall be what is known as two coat work on brick, tile or cement surfaces and three coat work on metal lath surfaces. All concrete surfaces shall be given a coat of bond plaster as called for above and finished with a finish coat of plaster only.

Apply a scratch coat to all metal lath surfaces, work plaster into and through the meshes of lath, leaving very little mortar on the face side of lath, then scratch in both directions with a lath scratcher. After scratch coat has set, thoroughly wet the surface well and apply the brown coat bringing it to a straight and even surface with rod and darby, ready to receive the finish coat.

Where plaster is applied directly to brick, tile and concrete surfaces, the surface shall be thoroughly wetted before plaster is applied. The first coat shall then be applied in a manner similar to the brown coat and surfaces left ready to receive finish coat.

Brown coat shall be applied evenly to all surfaces, brought out to correct planes, rodged and made perfectly true with six ft. straight edges, vertically, horizontally and diagonally. The mortar in all corners and angles shall be slack so that it will not fatten up, and all surfaces, corners and angles shall be made straight, sharp, plumb or level. Horizontal screeds shall be run at base and ceiling lines with intermediate screeds as required. Where wood grounds occur, screeds will not be required. Ceilings shall be screeded around angles and intermediate screeds shall be placed as required. Screeds shall be lined up true, even, level or plumb and then all spaces shall be filled with plaster left absolutely straight, true, even, level or plumb.

Finish coat shall be applied after base coat has set firm and hard. Base coat shall be well wetted before application of finish coat. All putty finish or Keene Cement shall be trowelled to a smooth, plane surface, leaving no trowel marks and shall be brushed with water while troweling to prevent too rapid setting. All plastered surfaces, except where otherwise noted shall be finished in Plaster of Paris white coat.

All plastered surfaces, except back of showers, in girls' toilet room, boys' locker and toilet room, the visiting team room, janitors' closet, toilet adjoining principal's office and toilet adjoining teachers' rest room shall be finished in Keene Cement. Walls back of blackboards and Bulletin Boards shall be finished with brown coat only. Wall back of showers shall be plastered with a 3/4 inch coat of one to two Portland cement plaster, applied in three coats. Plaster shall be carefully worked to avoid cracks and left with a neatly trowelled surface. Cement plaster shall extend to a height of 7 ft above the toilet room floor.

Beams extending below the ceilings and columns projecting from walls in plastered rooms shall be furred as hereinbefore specified and plastered the same as other furred surfaces. Work shall be straight and even. The finish coat shall be straightened by sticking special grounds in place and running the finish coat to them. Care shall be exercised to avoid staining.

200 - STAIR SOFFITS:

The soffits of all stairs except those from the first floor to the basement shall be metal furred, lathed and plastered. All plaster work about the stairs shall be true and even and brought to the exact surfaces as required. Careful attention shall be given the finishing of the plaster surfaces adjoining the metal strings, newels, etc.

Beads, curbs, facias, etc. shall be installed as indicated at the landings.

201 - PATCHING:

The contractor shall patch all plaster work as required to leave the job whole and complete in every respect after all other sub-contractors have finished, leaving no cracks, unevenness at any point or other defects.

202 - CLEARING SITE:

This contractor, upon completion of this contract, must remove from the building all tools, equipment, scaffolding and debris of every description arising from his work. All stains and defacement to the building of any kind resulting from the execution of this contract shall be removed by this contractor to the satisfaction of the Architect.

203 - GUARANTEE:

This contractor hereby guarantees all work under this contract against any defects in workmanship or material and also guarantees all plaster against popping, checking or falling off for a period of 12 months from date of acceptance of the building by the Architect, and also further agrees to repair or replace materials developing such defects within that time without additional cost to the Owner.

COMPOSITION AND CERAMIC
TILE

204 - GENERAL CONDITIONS:

The "General Conditions", pages 1 to 15 inclusive, apply to all contracts and form a part of and are included with these specifications for composition and ceramic tile.

205 - SCOPE OF THE CONTRACT:

This contract shall include all labor and material required to install all ceramic tile and composition tile of every description throughout the building as called for by the drawings, schedules and as required by these specifications.

206 - MATERIALS:

Ceramic Tile shall be commercial grade 2" x 2" "Sparta" ceramic tile as manufactured by the Sparta Ceramic Company of Cleveland, Ohio. Colors to be in the lighter range as selected.

Composition Tile shall be type "A" 3/16 inch thick asphalt tile as manufactured by the H. W. Johns-Manville Company. All tile to be in the "darker" shades.

Cement shall be an approved brand of non-staining Portland Cement. Cement shall fulfill the latest standard specifications for Portland cement of the American Society for Testing Materials.

Sand. Sand shall be clean, coarse sand, free from all deleterious matter and without mineral content which might stain the marble.

207 - WORKMANSHIP:

All work that is to be performed under this contract shall be done by mechanics skilled in their respective trades and all workmanship shall be of the very highest quality.

All work shall be absolutely straight, plumb and true and in perfect alignment with adjoining work. All joints shall be straight and uniform in size.

208 - SAMPLES:

This contractor shall submit to the Architect for approval, samples of all materials furnished under this contract. Approved samples shall remain in the office of the Architect and shall be taken as a standard for the materials which the contractor is to furnish for the work under this contract.

209 - SHOP DRAWINGS:

This contractor shall furnish shop and setting drawings to the Architect for approval as called for under "General Conditions".

These drawings shall show size of tile, color, patterns etc. in each room.

210 - MEASUREMENTS:

This contractor shall check all measurements at the building which will effect the installation of this work, report all discrepancies to the Architect for adjustment, and install all work in accordance with measurements existing at the building unless otherwise directed by the Architect in cases where discrepancies exist.

211 - STORAGE OF MATERIALS:

Composition and ceramic tile, etc. shall be protected against stains or damage of any kind. Water proof shelters shall be erected if necessary to give proper protection. Sand, cement, etc. shall be stored in such manner as not to mar or injure the building in any way.

212 - PROTECTION OF OTHER WORK:

This contractor shall store all material and install all work in such manner that work installed by him or by other contractors will not be injured in any way.

Mortar boxes, kettles, etc. shall preferably be located outside the building - if located inside, other work must be protected. In case of injury, all work damaged by this contractor shall be replaced at his expense.

213 - CUTTING AND FITTING:

This contractor shall cooperate with all other contractors and shall do all cutting, fitting, etc. for the latter where the same is required in connection with the work installed under this contract. Permission for all cutting which might impair the durability or beauty of the material must be obtained from the Architect before any cutting is done.

214 - SETTING MORTAR, CONCRETE FILL, ETC.:

This contractor shall furnish and install concrete fill under lockers, shower receptors, etc.

All mortar for fill shall be made of one part cement to two parts of sand for exposed work and one part cement, two parts sand, and four parts gravel where not exposed. Each batch shall be mixed with just enough water to give easy working qualities to the mortar.

The one to two mortar only shall be used for shower receptors and shall be used both for leveling and setting, and shall be of such thickness as to bring the top surfaces to exact levels.

Before spreading mortar, all concrete surfaces which have set shall be cleaned of all dirt and foreign matter, thoroughly moistened with water and then thoroughly and lightly coated with a paste of neat cement.

215 - JOINTS:

All joints shall be hair line joints, with edges or arrises parallel.

All jointings shall be arranged symmetrically and as shown on the approved shop drawings or as directed by the Architect.

216 - TOILET AND SHOWER PARTITIONS:

Toilet, shower and drying booth partitions shall be furnished and installed by others but this contractor shall assist by cutting and fitting his own work as required where the two materials join.

217 - SHOWER RECEPTORS:

This contractor shall furnish and install shower receptors in the girls' toilet, in the boys' toilet and locker room and in the visiting team room as indicated on the plan. Receptors shall be installed over a lead pan, laid directly on the finish concrete floor; lead pan to be furnished and installed by others. Receptors shall be roughly formed from concrete as called for above and finished with ceramic tile as hereinbefore specified. Tile shall be soaked in water, then carefully installed in a thin bed of neat cement over a fresh base coat of 1 to 2 setting mortar. Tile shall be brought to an exact surface with uniform pitch to the drain, and carefully and neatly finished about the drain and about the tile curb at the sides. The curbs shall be built up of concrete and faced with the same kind of tile as specified

for floors. Cove and bull nose tile shall be used at the interior and exterior corners of the curbs, with plain tile between. Curbs shall be approximately two inches high.

218 - TILE AND CEMENT BASE:

This contractor shall furnish and install 6 inch ceramic tile base in girls' toilet room, boys locker and toilet room, in the visiting team room, in the toilet adjoining the principal's office and in the toilet adjoining the teachers' rest room. Tile shall be installed as called for above for ceramic tile facing shower receptors. Tile shall be of a standard grade, black glazed, satin finish. This contractor shall furnish and install cement cove around the fill under the free standing lockers and the lockers placed against the walls in the toilet and locker rooms. Cove shall be approximately 2 inches high and shall be left with a square edge at the base to receive the asphalt tile.

219 - TILE WAINSCOTING:

This contractor shall furnish and install tile wainscoting in the corridors on the first and second floor, at the sides of the stairways from the first to the second floor and in the vestibules as called for on the plans and schedules. Wainscoting shall be approximately six ft. high and shall be formed of 5" x 12" furring tile as manufactured by the National Fire Proofing Company of Chicago, Illinois. Wainscoting shall start with a str. base at the floor, finishing with a moulded cap at the top. Str. base and cap only shall be used (as shown on the drawings) where lockers occur.

Tile work shall be installed with broken joints and with cove and bullnose fittings at all angles, etc. Special tile shall be furnished as required to finish about stairs, etc. Tile shall be set to a line with true and even courses. All joints shall be approximately 1/4 inch. Tile shall be set in accordance with the directions of the manufacturer and bedded solidly in a 1 to 2 Portland cement mortar. Tile shall be furnished in accordance with sample, color range #10.

220 - CERAMIC TILE WAINSCOTING: (ALTERNATE)

This contractor shall furnish and install the ceramic tile wainscoting in the first and second floor corridors, at the sides of the stairs from the first to the second floor and in the vestibules as called for on the plans and schedules. Tile wainscoting shall be commercial grade, 3" x 3" ceramic tile as hereinbefore specified. The two lower courses of tile shall be of the darker colors forming the

base extending completely around all corridors in which wainscoting is to be installed, under lockers in corridors, etc. Wainscoting shall have a total height of 4 ft. 6 in. with bull nose cap only extending around the upper part of the lockers.

All walls which are to receive wainscoting shall be dampened, then coated with a scratch coat of Portland cement mortar broomed or scratched before setting. The second coat of cement mortar shall be applied as soon as the first coat has set. It shall be brought to a true and even surface, then broomed or roughened to provide bond for the tile. Cement plaster shall be composed of one part Portland cement and one and one-half parts sand. Tile and wall shall be thoroughly soaked with water when tile is set. Tile shall be bedded solidly in a stiff paste of neat cement and joints filled with the same material. Entire space back of tile shall be filled with the cement paste, bringing the face of the tile to a true and even plane surface. All joints shall be level or plumb, uniform and even in size and completely filled with the cement paste.

221 - COMPOSITION TILE FLOORS:

Composition tile floors as hereinbefore specified shall be installed in all rooms and corridors on the first and second floors except in the Gymnasium, storage rooms, stage and dressing rooms, as called for on the plans and schedules. Composition tile shall also be installed at the stair landings and stair treads from the first to the second floor. Tile in all rooms and corridors shall be installed with a dark colored border and field of square tile of slightly lighter range of color. Tile inside of border line shall be of standard size, 6" x 6" or 9" x 9". Borders shall be of sufficient width to provide for standard size tile in fields.

All composition tile shall be laid in full beds of waterproof asphalt mastic over cement floor. Tile and mastic to be applied in strict accordance with the manufacturer's directions. Tile shall be laid with all joints true and even and the face of all tile shall be brought to true and even surfaces. Tile shall be carefully and neatly fitted about door frames, trim, etc.

222 - THRESHOLDS:

Cast bronze thresholds shall be furnished and installed by this contractor under the doors, where different materials are used for floors in adjoining rooms, under entrance doors and elsewhere as indicated on the plans. Thresholds shall be approximately 4" in width, $\frac{1}{2}$ " high and properly reinforced to withstand heavy traffic. They shall be of corrugated

type, similar to style D-4-C as manufactured by the Chase Brass and Copper Company of Waterbury, Conn. Thresholds shall be installed with 3/8" countersunk expansion bolts with lead and copper expansion shields as manufactured by the Ackerman-Johnson Company, 625 West Jackson Boulevard, Chicago, Illinois. An expansion bolt shall be used at each end and at intervals not to exceed 18 in. in each threshold.

323 - CURING AND PROTECTION

Tile floors laid in cement mortar shall be covered with wet sawdust or wet canvas for ten days after placing. All floors shall be protected with boards, paper, etc. to prevent damage from drying and to prevent over-loading before the cementing material has attained its full strength.

324 - CLEANING:

Tile floors, wainscoting, base and all other work installed by this contractor shall be cleaned with water as soon as the installation is completed. Composition tile shall be cleaned in accordance with the manufacturer's directions immediately after laying.

Care shall be exercised to prevent damage to wood-work (adjoining floors, door trim, etc.) while floors, etc. are being cleaned.

325 - CLEARING SITE:

This contractor shall leave all work installed by him clean and perfect in every respect and upon completion of his work shall immediately remove all his surplus material, machinery, equipment, debris, etc. from the premises.

326 - GUARANTEE:

All work installed under this contract which shows defects within one year from date of acceptance shall be removed and replaced by this contractor without additional cost to the Owner. All work so replaced must be in strict accordance with the plans and specifications.

PAINTING AND GLAZING

227 - GENERAL CONDITIONS:

The General Conditions, pages 1 to 15 inclusive, apply to all contracts and form a part of and are included with these specifications for Painting and Glazing.

228 - SCOPE OF THE CONTRACT:

This contract shall include the staining, sanding, varnishing, enameling and painting of all interior wood trim, the painting of all plaster surfaces; the painting of all exterior wood work, the painting of all window frames and sash, exterior door frames, doors, and the painting of all steel work, radiators, exposed piping, and the oiling of wood floors, etc. It shall also include the furnishing and installing of the glass and other material required for glazing and other work as hereinafter specified.

229 - MATERIALS:

White Lead shall be strictly pure National Lead Company, Eagle Pitcher Lead Company's or equal as approved by the Architect.

Linseed Oil shall be strictly pure, conforming to United States Government Specifications as stated in Bureau of Standards Bulletin No. 86.

Colors shall be pure pigment ground in linseed oil.

Putty shall be composed of whiting, 90 percent white lead paste and 10 percent linseed oil as required.

Enamel. All enamel shall be Pratt and Lambert's Vitralite. All enamel undercoating shall be equal to that manufactured by Pratt and Lambert.

Interior Varnish. All gloss varnish shall be Pratt and Lambert's #61. All dull varnish shall be Pratt and Lambert's dull cote.

Spar Varnish. Spar Varnish shall be best quality Spar varnish as manufactured by Pratt and Lambert Company.

Shellac. Shellac shall be clear, pure grain alcohol shellac.

Stain. Stain for interior work shall be best quality oil stain as manufactured by the Standard Varnish Company. Colors of stain to be as selected.

Plate Glass. Plate and tapestry glass shall be 3/8" thick, of the best grades of "Glazing Quality" as manufacture by the Pittsburgh Plate Glass Company.

Drawn Glass shall be "A" quality, double strength glass as manufactured by the Libbey-Owens Glass Co.,

Wire Glass. Wire glass shall be 3/8" ribbed wire glass as manufactured by the Mississippi Wire Glass Company.

Glazing Points; Glazing points shall be 1/2" diamond points cut from #11 ga. zinc.

230 - WORKMANSHIP:

All work executed under this contract shall be done by mechanics skilled in their respective trades and all workmanship shall be first class in every respect.

231 - EQUIPMENT:

This contractor shall furnish all brushes, sand paper, drop cloths, ladders, scaffolding, etc. required in the execution of this contract.

232 - PAINT ROOM:

The northeast corner room in the basement shall be used as a storage and mixing room for paint. This contractor shall cover at least 100 sq. ft. of the floor where the material is stored with Sisal Kraft paper. Paper shall be maintained in good condition until all materials are removed.

233 - PREPARATION OF SURFACES:

Before applying any paint or stain or finish of any kind, all surfaces shall be thoroughly dry, and shall be cleaned of all dirt, rust, grease or other foreign matter, and be in ideal condition for finish in every respect.

234 - CONDITIONS OF THE WEATHER, TEMPERATURE, ETC.

No exterior painting shall be done during damp or rainy weather nor when the temperature is less than fifty degrees F. and no painting shall be done in extremely hot or dusty weather. Proper light and ventilation shall be provided for all painting. All interior painting shall be done at temperatures ranging from seventy degrees to eighty degrees F.

235 - PUTTYING AND STOPPING:

All outside and inside woodwork shall have all nail holes and imperfections puttied up immediately after prime coat has been applied.

236 - COLORS:

The colors of all paint and stain shall be as directed by the Architect.

237 - SAMPLES:

This contractor shall prepare samples of all stained, painted, enameled and varnished work for approval by the Architect. Samples shall be on same material as finished work and shall be 3" wide and 30" long. Each sample shall be divided into an equal number of parts, one part showing the material uncoated, the next stained or primed, and the other parts showing each succeeding coat in the order of their application. No work shall be started at the building until samples have been approved.

238 - EXTERIOR PAINTING:

This contractor shall examine the specifications for carpentry, millwork and ornamental iron work to determine the extent of priming and painting to be done by others. All priming and painting hereinbefore called for shall be done by this contractor except that portion which is specified to be done at the mills. All exterior work must be back painted and primed on the face as soon as it is delivered on the site and before erection.

All material must be thoroughly clean, dry, etc. as hereinbefore specified before priming, and after priming shall be stacked separately until dry. Each coat shall be permitted to dry thoroughly before the next coat is applied. All nails must be set and all holes, etc. puttied before the second coat is applied. All exterior wood and iron work shall be given two coats of paint in addition to the prime coat.

Prime coat of paint for wood shall be mixed in the proportion of 100 lbs. white lead, 4 gallons raw linseed oil, and two gallons of pure turpentine. Second coat shall be mixed in the proportions of 100 lbs. white lead, 2 gallons pure linseed oil and one gallon of turpentine. Third coat shall be mixed in the proportion of 100 lbs. white lead, 3 gallons raw linseed oil and two pints of turpentine. Exterior galvanized iron shall be washed with ammonia, primed with blue seal lead and oil and then finished with two coats of paint, same as specified for other iron work.

239 - INTERIOR PAINTING:

All interior oak trim, doors, etc. shall be given a first coat of combined stain and filler, thoroughly rubbed and worked into the grain of the wood, permitted to set, then all surplus wiped off leaving the wood clean and with a clear tone. Filler and stain when dry shall be followed by a thin coat of white shallac, carefully brushed on to cover the entire surface of the wood. Over this apply a coat of Pratt and Lambert's No. 61 gloss varnish and finish with a coat of Pratt and Lambert's No. 61 "Dulkote".

All oak window stools shall be filled and stained as called for above for other oak finish, then finished with three coats of Spar varnish. Sand lightly between coats and remove all dust before the succeeding coat is applied. All interior trim, doors, etc. in the basement shall be finished as specified above for exterior wood work. All interior trim in toilet rooms and locker rooms shall be given two coats of enamel undercoating, one coat of gloss enamel and a final coat of dull enamel. Sand and clean between coats as called for above for varnished work. All trim, shelving and interiors of cabinets in closets and rooms shall be finished the same as specified above for other varnished work.

Maple floors in Gymnasium shall be given two coats of hot linseed oil. The first coat shall be mixed with ten percent purpentine, the last coat shall be mixed with approximately 5 percent Japan drier. Basket Ball court shall be laid out with 2" bands as indicated on the drawings. Bands shall be given two coats of lead and oil paint in colors as directed applied over the oil as called for above.

240 - PLASTER FINISH:

All plaster surfaces except surfaces finished with Portland cement in the girls' toilet, the boys' locker and toilet room, visiting team room, toilet adjoining principal's office and toilet adjoining teachers' rest room shall be given one coat of varnish size, two coats of Pratt & Lambert's undercoating, one coat of gloss enamel and finished with one coat of dull enamel. Each coat shall be permitted to dry and then lightly sanded and cleaned before the following coat is applied.

241 - INTERIOR ORNAMENTAL IRON:

All exposed surfaces of stairs, railings, newel posts, toilet partitions, etc. shall be given two coats of enamel undercoating in addition to prime or shop coat and finished with one coat of gloss enamel and a final coat of dull enamel in colors as approved. Metal surfaces shall be sanded and cleaned between coats.

242 - STRUCTURAL STEEL AND IRON WORK:

All structural steel and iron work shall be cleaned, and all places where the prime coat of paint has been damaged, touched up and then given two coats of paint as called for above in Article No. 238 immediately after the steel has been erected.

243 - RADIATORS AND EXPOSED PIPING:

All radiators shall be primed at the shop by others. All exposed piping except brass pipe in toilet rooms, showers, etc. ; all exposed sheet metal work except copper work of vents, etc. shall be primed with blue seal lead and oil as hereinbefore specified for prime coat on steel. Exposed pipe and boiler covering shall be given a prime coat of varnish size. All scratched or broken places in prime coat shall be patched, then radiators and exposed piping, covering, etc. shall be given two coats of paint composed of linseed oil, turpentine and lithopone, mixed to proper consistency for spreading - colors to be as approved. Unvented will have enamel finish baked on at the factory.

244 - CONCRETE WALLS:

All concrete block walls in the Gymnasium, stage, dressing rooms and ticket office shall be brushed with clear water, then given a coat of thin cement paste. Paste shall be composed of white Portland Cement and water mixed to the proper consistency, for spreading on with a brush.

245 - GLASS SIZES:

Sizes of all glass shall be taken from the sash. This contract contemplates all glass set in place in the building, complete. This contractor shall cooperate with the subcontractor for millwork in obtaining sizes and setting glass.

246 - PLATE GLASS:

Plate Glass as hereinbefore specified shall be used on doors in the trophy case. Edges of glass shall be ground and slightly rounded. One exposed edge of each sheet shall be ground, rounded and polished.

247 - DRAWN GLASS:

Drawn Glass as hereinbefore specified shall be used for glazing all windows except toilet room windows and all exterior doors. It shall also be used for glazing door and sash in wood partition between rooms No. 202 and 203.

248 - TAPESTRY GLASS:

Tapestry glass, as hereinbefore specified shall be used for glazing all interior doors where glass is called for and the windows in the girls' toilet room, the boys' toilet and locker room, the visiting team room,

249 - WIRE GLASS:

This contractor shall furnish and install wire glass as hereinbefore specified in marquise at each east entrance. Glass shall be neatly bedded in putty, surplus putty removed with ribs left clean and free from obstruction to back edge of condensation gutter. Cap strips shall be filled with putty pressed closely in place and secured with fasteners provided by contractor for roofing and sheet metal work.

250 - GLAZING:

All glass shall be set by this contractor, in a first class and workmanlike manner.

Glass shall be cut square and true to fit frames or sash accurately. All glass shall be set so that there is an equal bearing the entire length and width of each pane.

All glass in exterior wood sash shall be bedded in putty, tacked in place by glaziers' points and neatly face puttied. Putty shall fill the depth and rebate completely. Putty rebate shall be primed with white lead and oil by glazier just before glass is set, only enough time elapsing to allow prime coat to dry.

All other glass shall be bedded in putty and set in wood stops or tacked in place and neatly face puttied as called for by the drawings.

251 - BREAKAGE:

This contractor shall take extraordinary precaution for the protection of all glass furnished under this contract after same is set in place in the building and will be held responsible for all breakage until the building is turned over to the Owner. All glass broken before this time shall be replaced by this contractor without extra charge.

252 - PROTECTION AND CLEANING:

This contractor shall take all reasonable precautions against staining adjacent work with paint materials and upon completion of his work shall carefully remove all such stains. He shall protect freshly applied paint and varnish from dust, etc. and shall protect his work from injury at all times. When all other work is completed, this contractor shall wash and clean all glass, leaving it clean, polished, and free of all scratches, oil, paint, grease, stains or other imperfections, or foreign matter.

253 - CLEARING SITE:

This contractor shall leave all work installed by him clean and perfect in every respect and upon completion of his work shall immediately remove all his surplus material, machinery, equipment, debris, etc. from the premises.

254 - GUARANTEE:

All work installed under this contract which shows defects within one year from date of acceptance shall be removed and replaced by this contractor without additional cost to the Owner. All work so replaced must be in strict accordance with the Plans and Specifications.

ROOFING AND SHEET METAL
WORK

255 - GENERAL CONDITIONS:

The "General Conditions" pages, 1 to 15 inclusive, apply to all contracts and form a part of and are included with these specifications for Roofing and Sheet Metal Work.

256 - SCOPE OF THE WORK:

This contract shall include all labor and material required to install all roofing and sheet metal work for the entire building as shown on the drawings and required by these specifications, including all composition roofing, roof insulation, metal flashing, ventilators, leaders, sheet metal work on marquise, etc.

257 - MATERIALS:

Felt for composition roofing shall be asbestos felt weighing 15 lbs. per 100 sq. ft.

Asphalt shall be of highest grade for roofing work.

Sheet Metal for all exterior work except leader heads and leaders shall be 16 oz. soft copper. Sheet metal for leader heads and leaders shall be 24 ga. Armco iron, galvanized. Sheet metal for interior vent ducts shall be 26 ga. galvanized iron.

Sheet Lead shall be standard grade lead, not less than 1/8 inch thick.

Insulation shall be 1" cork standard insulation grade.

All roofing felt, asphalt, flashing materials, etc. (except metal) shall be or be equal as approved to those manufactured by the H. W. Johns-Manville Company.

258 - WORKMANSHIP:

All work executed under this contract shall be done by mechanics skilled in their respective trades and all workmanship shall be first class in every respect.

259 - TOOLS, EQUIPMENT, ETC:

This contractor shall furnish all tools, ladders, scaffolding, hoists and other equipment required for installing the materials furnished under this contract and

shall maintain them in good, serviceable condition until the work is completed.

260 - INSULATION:

This contractor shall furnish and install a 1" thick layer of standard insulation cork over the entire roof. The cork shall be in blocks of standard size with unbroken edges, forming a smooth, solid surface to receive the roofing.

The entire roof surface shall be coated with asphalt primer and then given a heavy mop coat of hot asphalt into which the cork blocks shall be embedded before the asphalt cools. Blocks shall be set in the asphalt and shoved in place forcing the asphalt to completely fill the vertical side and end joints.

261 - SCUPPERS:

This contractor shall furnish and install a scupper of 16 oz. soft copper at each of the openings through the fire wall at the roof line at locations as indicated on the plans. Scupper shall be solidly constructed with locked and sweated joints. Copper shall extend 12" into the roof construction and project 2 inches outside over the inner edge of the leader heads. Scuppers shall be installed as a part of the composition roof. Sides of scuppers shall extend 10" above the top of the cant strip.

262 - COMPOSITION ROOFING:

This contractor shall furnish and install a type "A" four-ply composition roof over all roof surfaces as indicated on the plans. A single sheet of 30 lb. asbestos felt shall be embedded in hot asphalt over the insulation at each scupper. Sheet shall be at least 30 inches wide and 72 inches long. Scuppers shall be installed in hot asphalt over the 30 lb. felt. After scuppers have been installed the composition roofing shall be installed, starting at the low side of the roof over the scupper aprons. Four layers of 15 lb. asbestos felt shall be applied, each sheet lapping 24½ inches over the preceding one. Each sheet shall be laid in a full bed of hot asphalt and firmly pressed or rolled in place. The lower sheets shall be laid in a continuous layer of hot asphalt, applied directly to the roof insulation.

After all felts have been applied the entire roof shall be given a coat of hot asphalt. Approximately 30# of asphalt per 100 sq. ft. will be required for each mopping. Roofing shall be applied over cant strips and shall extend at least 2 inches against vertical surfaces above the top of the cant strips.

All layers of felt shall be applied without wrinkles or buckles and shall be rolled so that at no time shall the mopping be more than three feet ahead of the roll. End laps of all sheets shall be not less than 6 inches wide. Brick walls above cant strips shall be given a coat of primer where roofing is applied to them. Roofing applied to the walls shall be laid in hot asphalt as called for above for over insulation.

263 - BASE FLASHING:

All masonry surfaces to a height of 6 inches above the top of the cant strips shall be given a coat of asphalt primer. After the wall has been primed a standard H. W. Johns-Manvill base flashing shall be applied extending 6" above the top of the cant strip and at least 4 inches out on the roof from the lower edge of the cant strip. Base flashing shall be applied in a continuous mopping of hot asphalt and well broomed or pressed in place. Ends of sheets shall lap at least 3" and be embedded in hot asphalt. The upper edge of base flashing shall be nailed into the brick joints at 2 inch intervals with large head galvanized 4d roofing nails. A strip of roofing felt 4 inches wide shall be embedded in hot asphalt, covering the lower edge of the base flashing. The base flashing shall extend the full height and turn over on top of curbs around scuttle and ventilator. Flashing shall be nailed to top of curbs. A coat of hot asphalt shall be applied over the base flashing extending from the roof to the lower edge of the cap flashing.

264 - CAP FLASHING:

A layer of Asbestile 1/8 inch thick and 5 inches wide shall be applied over the top edge of the base flashing, covering nail heads, etc. and extending a slight distance over the brick walls. Walls shall be primed before asbestile is applied. A strip of felt four inches wide shall be embedded in the first coat of asbestile. A second coat of Asbestile shall be applied over the strip of felt and extend to the lower side of the raggle for copper flashing.

265 - LEAD FLASHING:

This contractor shall furnish and install sheet lead flashing, as hereinbefore specified, about all vent pipes extending through the roof. Sheet lead shall extend at least 12 inches from pipe on all sides. Pipe shall be covered with

Lead pipe of same thickness as sheet lead. Lead pipe shall be soldered or wiped at the lower side to the lead flashing. Upper end of pipe shall be turned down inside the vent pipe. Composition roofing shall extend at least six inches up against pipe and be covered with the lead flashing. Flashing shall be set in hot asphalt, applied over the composition roofing.

266 - RAGGLES:

Raggles 1-1/4 inch deep will be left by the mason contractor in the fire walls as they are built if directed to do so by this contractor. If they are not left in the walls are built they shall be formed by this contractor to receive copper flashing. After sheet metal work and flashings are in place and securely wedged with lead or copper wedges, this contractor shall calk all raggles and point them up with elastic cement as to make them absolutely water tight.

267 - COPPER FLASHING:

This contractor shall furnish and install 16 oz. soft copper flashing over all composition roofing at walls, curbs, etc. Copper flashing shall also be installed over scuppers, making the entire roof weather and water tight. Copper flashing shall be approximately 8 inches wide, and installed in six or eight sections and shall be lapped 2 inches at ends. Upper edge of all flashing, where it extends into raggles, in brick walls, shall be folded back 1/4 inch. Flashing shall extend at least one inch into raggles and be wedged in place with rolled copper or lead wedges. Raggles shall be pointed after flashing is in place as called for in Article #266. Flashing about curbs shall lap over tops of curbs and be nailed in place with 4d copper roofing nails, spaced 2 inches etc. All flashing shall be bent down and fitted closely against the roofing below.

268 - SCUTTLE:

This contractor shall cover the upper scuttle door with copper as hereinbefore specified. Copper shall be in sheets applied with locked and soldered joints. Sheets shall be attached to the wood with copper strips nailed to wood, folded with and soldered to the sheets at the joints. Cover shall be doubled at edges and extended down over the curb forming a drip. Sheets at edges of door shall be blind nailed with 4d copper roofing nails spaced 2 inches etc. A sheet of hard finished water proof paper shall be installed between the copper and the wood cover and hinges, etc.

269 - VENTILATORS:

This contractor shall furnish and install ventilators as indicated on the drawings. All ventilators shall be of the Rotary ball bearing type as manufactured by the Swarthout Company of Cleveland, Ohio. Ventilators over toilet rooms (shown connected to vents) shall be 12 inches in diameter without louvres.

Ventilators for class rooms, gymnasium, etc. shall be of 24 inch diameter and shall be provided with standard louvres in the front and close fitting damper at the base. The louvres and damper of each ventilator shall be connected and arranged for operating as a single unit, remaining closed against back drafts but opening under slight pressure from the inside.

Each ventilator shall be furnished complete with base. Base in each case shall change from round to square to fit over the curb provided for it. Bases shall be special - not exceeding 16 inches in height.

Ventilators shall be rigidly braced with copper bars and substantially secured to the curbs with lag bolts or screws attached to the inside of the curbs.

Ventilators and bases shall be made of copper. The 12 inch size of 18 ounce copper and the 24 inch size of 20 ounce copper.

270 - GUTTER AND LEADERHEADS:

This contractor shall furnish and install gutter for roof over stairs from Gymnasium to Agriculture Laboratory and leader heads or gutters for the roof over the remainder of the building. Gutter for the roof over the stairs shall be approximately 4 inches square; leaderheads or gutters for the main roof shall be of sizes indicated. The 4 inch gutter shall be supported on 1/4 inch x 3/4 inch hangers built into the concrete roof on masonry walls. Leader head shall be supported in a similar manner. Leader heads and gutters shall be reinforced and braced to prevent damage by freezing, wind, heavy downpour of water, etc.

Gutters and leader heads shall be made of 24 ga. galvanized Armco iron.

271 - LEADERS:

Leaders for roof over stairs to Agricultural Laboratory and for main roof shall be of sizes indicated on the plans, and shall be made of 24 ga. galvanized iron as hereinbefore specified. Each header shall be provided with

a cast iron shoe at the base to which it shall be connected. . Leaders shall be fabricated in as long lengths as practicable with locked and soldered joints. Joints in field shall be soldered. Leaders shall be supported on drive type concealed galvanized malleable iron hangers placed back of each cleat. Cleats shall be as indicated, neatly and carefully made. Joint between leaders and cast iron shoes shall be made by calking with a ring of oakum and pointing with elastic cement.

Leaders for marquise shall be 2 inch square corrugated, made of 16 oz. copper. Copper leaders shall be provided with cills at the bottom and discharge on the ground just above grade.

272 - MARQUISE:

This contractor shall furnish and install all sheet metal work required for marquise. The entire frame, including muntins shall be of wood by others but shall be covered with copper as detailed by this contractor.

Provisions for glazing shall be made as shown with rebate for putty, condensation gutter, cover or stop, etc.

Gutter shall be formed at the wall and connected to leaders. Space back of gutter shall be covered and flashed. All parts on both the upper and lower sides except glass shall be covered with sheet metal. Sheet metal work shall be neatly installed with locked, folded, and soldered joints completely protecting all parts and making a water and weather tight installation. All sheet metal work shall be of 16 oz. soft copper.

273 - VENTS:

This contractor shall furnish and install vents of 26 ga. galvanized iron from the girls' toilet room, the boys' locker and toilet room and the visiting team room and connect them to the lower side of the curbs for the ventilators. The ducts from the boys' toilet and the visiting team room shall be connected together above the ceiling of second floor. A duct shall also be installed over the vent from the toilet adjoining the principal's office and the teachers' rest room and connected to the curb of the ventilator over them. Ducts shall be continuous and fabricated with locked joints and connected with drive cleats.

Metal ducts will not be required for other vents as they will discharge into the attic space above the ceiling of the second floor. Dampers shall be provided in the base

of the vents from the girls' toilet, the boys' toilet and locker room and the visiting team room.

274 - REGISTERS:

This contractor shall furnish and install a 12" x 16" key set register near the base of each class room vent. Register front, case and louvres to be made of pressed steel. Registers to be finished all over in black Japan. Grille shall be plain lattice design, 3/4" square opening with 3/16 inch bars. Woodbucks shall be furnished and set by others in openings where registers are to be installed. Registers shall be attached to bucks with a round head wood screw at each corner of the grille. Register face shall lap over the plaster approximately 1/4 inch on all sides. Registers shall be or be equal as approved to No. 6800 as manufactured by Hart and Cooley Company of New Britain, Conn. Five registers as called for above shall be installed in the west wall of the Gymnasium near the top.

275 - COPPER BOX:

This contractor shall furnish a box made of 16 oz. soft copper for installation in the corner stone. Box shall be made with locked joints soldered. Lid of box shall be turned down on all sides fitting closely into slot in top of box. Lid shall be soldered in place at the site after records are placed in the box, at the time the corner stone is set. Box shall be 1/4 inch smaller each way than the opening in the stone.

276 - SCREENS:

Wire screens of 14 ga. copper wire with 1/4" mesh and screens of 16 mesh bronze wire shall be furnished and installed over the outlet to each ventilator. Wire shall be neatly fitted and soldered along all edges to the front of the ventilator.

277 - PROTECTION AND CLEANING:

This contractor shall sweep down all roofs and clean out all gutters, etc. after all other work on this contract has been completed. Down spout connections shall be closed at all times until this work is done. When all roofs and gutters are clean, the closures to the down spouts shall be removed and copper bird and leaf guards of 14 ga. copper wire installed securely in place. All work installed under this contract shall be covered and protected by this contractor until all work on the building is completed.

278 - CLEARING SITE:

This contractor shall leave all work installed by him clean and perfect in every respect and upon completion of his work shall immediately remove all his surplus

material, machinery, equipment, debris, etc. from the premises.

379 - GUARANTEE:

This contractor hereby guarantees all material used in connection with the roofing, etc. free from all defects for a period of five years from date of acceptance and further guarantees the entire roof, including flashings, ventilators, etc. tight and serviceable for the same period. The signing of the contract of which these specifications are a part shall be considered a signing of this guarantee. Any failure to fulfill this guarantee by reason of any defect or deficiency of workmanship or material whatever within the five year period above stated shall be made good by this contractor within a reasonable time after receiving notice of such defect.

FINISH HARDWARE

280 - GENERAL CONDITIONS:

The "General Conditions" pages 1 to 15 inclusive apply to all contracts and form a part of and are included with these specifications for furnishing Finish Hardware.

281 - SCOPE OF THE CONTRACT:

This contractor shall furnish all finish hardware for doors, windows, cabinet doors, drawers, scuttle doors, access doors, coat hooks, etc.

282 - MATERIALS:

All door knobs, roses, turn knobs, escutcheons, handles, sash lifts, cupboard turns, etc. shall be of cast bronze. Fronts, bolts, etc. of locks shall also be of cast bronze.

Hinges shall be of steel, plated or galvanized.

Window locks shall be of cast iron, plated.

283 - FINISH:

All hardware, except where otherwise noted, shall be dark statuary bronze finish.

Hardware in toilet rooms shall be nickel plated.

Hinges of exterior doors opening out shall be galvanized finish.

284 - KEYS:

All exterior doors shall be keyed alike. All classroom doors and door to germinating room shall be keyed alike. Toilet rooms doors and door to janitor's closet shall be keyed alike.

Offices shall be keyed differently.

Doors between corridors, and doors in basement except for germinating room. shall be keyed same as toilet rooms.

Closet doors shall be keyed differently.

Ten keys shall be furnished for exterior doors and six for each group of interior doors.

285 - DELIVERY AND CHECKING:

All hardware shall be delivered to the hardware room in the building by this contractor and checked in the presence of the carpenter contractor and Architect. The contractor shall furnish receipts for the hardware to the contractor furnishing the hardware and to the Architect and be responsible for it until the building is completed and accepted by the Architect.

Any hardware misplaced, lost or damaged after delivery at the building shall be replaced by the carpenter contractor at his expense.

286 - STANDARDS:

All numbers of hardware noted in the schedule refer to Sargent and Company's Catalog issue of 1926 and all hardware, except as otherwise noted, shall be manufactured by them.

287 - SUBSTITUTIONS:

The schedules and these specifications are based on furnishing hardware as called for in Article No. 286. Other standard hardware, however, of the same type, finish, weight, etc. will be equally acceptable. Proposals for furnishing other makes of hardware must show catalog numbers, etc. and will be subject to approval by the Architect.

288 - SAMPLES:

Samples will not be required for hardware if furnished as specified. Samples will be required, however, for substitutions. Samples will be returned after final approval.

289 - SCHEDULE:

BASEMENT

1 Single Door - Exterior to Boiler room

3-0 x 7-0 x 1 $\frac{3}{4}$ - R.H.

1 Lockset #6725 complete with 1 cyl. and turn knob #127

1 Pair knobs #1852 complete with straight spindle and rose #278

1 $\frac{1}{2}$ Pair butts 4 $\frac{1}{2}$ " x 4 $\frac{1}{2}$ " Stanley #604Z B.P.
Door Holder #5234

1 Pair Doors - Exterior to Agriculture Lab.

Two 4-0 x 8-0 x 1 $\frac{3}{4}$ - Lock on R.H. Door

1 Lockset #6825R complete with 1 cyl. and turn knob #127

2 Pairs knobs #1852 complete with straight spindle and rose #278.

1 Top extension bolt #1116-R - 18"

1 bottom extension bolt #1116 R. - 12"
3 Pairs butts, 4½" x 4½" Stanley #804Z B.P.
Door Holders #5244 on each door.

1 Single Door - Corridor to Boiler Room

3-0 x 7-0 x 1½ L.H.

1 Single Door - Boiler R. to Germinating Room.

3-0 x 7-0 x 1½ R.H.

2 Locksets #5639 complete with key escut-
cheons #812.

2 Pairs knobs #1852 complete with straight
spindles and roses #278

3 Pairs butts, 4½" x 4½" Stanley #804Z B.P.

1 Single Door - Boiler Room to Coal Room

3-0 x 7-0 x 1½ - R.H.R.B.

1 Lockset #4634

1 Pair Knobs #1642 complete with straight
spindle and rose #278

FIRST FLOOR

2 Pairs Doors - East Entrances

Four 2-8 x 8-0 x 1½ - Locks on R.H.R.B. doors

2 locksets #4861-R with one cylinder and
turn knob #127

4 Push Bars #323 with ¾" roses under
screw heads

4 door handles - #732 with ¾" roses under
inside screws

2 Top Extension Bolts #1116 R - 18"

2 Bottom Extension Bolts #1116 R - 12"

6 Prs. butts 4½" x 4½" Stanley #804Z B.P.

4 Door Closers #525 with brackets and auto-
matic hold open arms.

1 Pair Doors - Exterior to Ticket Office

Two 2-6 x 7-0 x 1½ Lock on R.H.R.B. Door

1 Lockset #4861 R complete with one cyl.
and turn knob #127

2 Push Bars #323 with ¾" roses under
screw heads - 24" long

2 Door Handles #729 with ¾" roses under
inside screws

1 Top extension bolt #1116-R - 18"

1 Bottom extension bolt #1116 R - 12"

3 Prs. butts 4½" x 4½" Stanley #804Z B.P.

2 Door closers #525 with brackets and
automatic hold open arms.

1 Single Door - Exterior to Room #102.

3-0 x 7-0 x 1½ L.H.R.B.

1 Lockset #6725 complete with one cyl.
and turn knob #127.

- 1 Pr. knobs #1842 complete with straight spindle and rose #278
- 1½ Pr. Butts 4½" x 4½" Stanley #8042 B.P.
- 1 Door closer #525 with bracket and automatic hold open arm.
- 2 Pairs Doors - Vestibule to Corridor - D.A.
 - Four 2-6 x 7-0 x 1½
 - 8 push bars #323 with ¾" roses under screw heads - 24" long
 - 4 Pairs D.A. spring pivot hinges #5001 as manufactured by the Chicago Spring Hinge Co. Hinges to be provided with invisible bottom shoe for use without side plate and with plunger type top pivot.
- 1 Single Door - Vestibule to Basement
 - 3-0 x 7-0 x 1½ R.H.R.B.
- 1 Single Door - Vestibule to Basement
 - 3-0 x 7-0 x 1½ L.H.R.B.
 - 2 Locksets #5639 complete with key escutcheons #812
 - 2 Pairs knobs #1852 complete with straight spindles and roses #278.
 - 3 Pairs Butts 4½" x 4½" Stanley #241
- 2 Single Doors - Corridor to Class Room
 - 3-0 x 7-0 x 1½ R.H.R.B.
- 2 Single Doors - Corridor to Class Room
 - 3-0 x 7-0 x 1½ L.H.R.B.
- 1 Single Door - Room 113 to Room 114
 - 3-0 x 7-0 x 1½ L.H.R.B.
 - 5 Locksets #5639 complete with key escutcheons #812.
 - 5 Pairs knobs #1852 complete with straight spindles and roses #278.
 - 7½ Pairs butts 4½" x 4½" Stanley No. 241.
- 1 Single Door Corridor to Room #113
 - 3-0 x 7-0 x 1½ R.H.R.B.
- 1 Single Door Corridor to Room #105
 - 3-0 x 7-0 x 1½ R.H.
- 1 Single Door Room #102 to Room #105
 - 3-0 x 7-0 x 1½ R.H.
 - 3 Locksets #5639 with key escutcheons #812
 - 3 Pairs knobs #1852 complete with straight spindles and roses #278
 - 4½ Pairs butts - 4½" x 4½" Stanley No. 241
- 2 Pairs Doors - Corridor to Gymnasium
 - Four 2-6 x 7-0 x 1½
- 1 Pair Doors - Ticket Office to Gymnasium
 - Two 2-6 x 7-0 x 1½ - Locks on R.H.R.B. Doors
 - 3 Locksets #5639-R
 - 6 Pairs knobs #1852 complete with straight spindles and roses #278

- 3 top extension bolts #1116-R - 12"
 3 bottom extension bolts #1116-R - 12"
 9 Prs. butts, $4\frac{1}{2}"$ x $4\frac{1}{2}"$ - Stanley #241
1 Single Door - Domestic Science to Gym.
 3-0 x 7-0 x $1\frac{3}{4}"$ R.H.R.B.
1 Single Door - Domestic Science to Gym.
 3-0 x 7-0 x $1\frac{3}{4}"$ L.H.R.B.
1 Single Door - Room #105 to Gym. 3-0 x 7-0 x $1\frac{3}{4}"$ R.H.R.B.
1 Single Room - Room #102 to Gym. 3-0 x 7-0 x $1\frac{3}{4}"$ L.H.R.B.
1 Single Door - Gym. to Agriculture Lab.
 2-6 x 7-0 x $1\frac{3}{4}"$ R.H.
 5 Locksets #5639 complete with key escutcheons #812
 5 Pairs of knobs #1852 complete with straight spindles and roses #278
 $7\frac{1}{2}$ Pairs butts - $4\frac{1}{2}"$ x $4\frac{1}{2}"$ Stanley #241
1 Single Door, Room #105 to Visiting Team Rm.
 3-0 x 7-0 x $1\frac{3}{4}"$ R.H.
1 Single Door, Room #102 to Boys' locker and Toilet Rm.
 3-0 x 7-0 x $1\frac{3}{4}"$ R.H.R.B.
1 Single Door, Room #113 to Girls' toilet Room
 2-6 x 7-0 x $1\frac{3}{4}"$ R.H.R.B.
 3 Locksets #5639 complete with key escutcheons #812.
 3 Pairs knobs #1852 complete with straight spindle and rose #278.
 $4\frac{1}{2}$ Pairs butts - $4\frac{1}{2}"$ x $4\frac{1}{2}"$ - Stanley #241
 3 Door Closers #523.
 Note: Hardware exposed in toilet rooms to be N.P.
1 Single Door - Room 105 to Janitor's closet
 3-0 x 7-0 x $1\frac{3}{4}"$ L.H.R.B.
 1 Lockset #5639 complete with key escutcheons #812.
 1 Pair knobs #1852 complete with straight spindles and roses #278.
 $1\frac{1}{2}$ Prs. Butts - $4\frac{1}{2}"$ x $4\frac{1}{2}"$ Stanley No. 241.
1 Single Door - Corridor to Office -
 2-8 x 7-0 x $1\frac{3}{4}"$ L.H.
 1 Lockset #6725 complete with one cyl. and turn knob #127
 1 Pair knobs #1852 complete with straight spindle and roses #278.
 $1\frac{1}{2}$ Prs. butts, $4\frac{1}{2}"$ x $4\frac{1}{2}"$ Stanley #241
 1 Door closer No. 523
1 Single Door - Room 109 to 109-A
 2-0 x 7-0 x $1\frac{3}{4}"$ R.H.R.B.
 1 Lockset #5639 complete with key escut-
 chrons #812.
 1 Pair knobs #1852 complete with straight
 spindles and roses #278
 $1\frac{1}{2}$ Prs. Butts, $4\frac{1}{2}"$ x $4\frac{1}{2}"$ Stanley #241.

1 Single Door - Room 109 to Toilet Room

2-0 x 7-0 x 1 $\frac{3}{4}$ L.H.

1 Lockset #4664 $\frac{3}{4}$ complete with emergency key, key escutcheon and turn knob #127

1 Pair knobs #1852 complete with straight spindle and roses #278

1 $\frac{1}{2}$ Pairs Butts - 4 $\frac{1}{2}$ " x 4 $\frac{1}{2}$ " Stanley No. 241

2 Single Doors - Stage to Dressing Rooms

2-6 x 7-0 x 1 $\frac{3}{4}$ R.H.

2 Single Doors - Stage to Dressing Rooms

2-6 x 7-0 x 1 $\frac{3}{4}$

4 Locksets #5639 complete with key escutcheons #812

4 Prs. Knobs #1852 complete with straight spindles and roses #278

6 Prs. Butts - 4 $\frac{1}{2}$ " x 4 $\frac{1}{2}$ " - Stanley No. 241.

SECOND FLOOR

3 Single Doors - Corridor to Class Rooms -

3-0 x 7-0 x 1 $\frac{3}{4}$ R.H.R.B.

4 Single Doors - Corridor to Class Rooms

3-0 x 7-0 x 1 $\frac{3}{4}$ L.H.R.B.

7 Locksets #5639 complete with key escutcheons #812

7 Prs. Knobs #1852 complete with straight spindles and roses #278

10 $\frac{1}{2}$ prs. butts - 4 $\frac{1}{2}$ " x 4 $\frac{1}{2}$ " Stanley No. 241

1 Single Door - Corridor to Rest Room

2-8 x 7-0 x 1 $\frac{3}{4}$ L.H.

1 Lockset #5639 complete with key escutcheons.

1 Pr. Knobs #1852 complete with straight spindles and roses #278

1 $\frac{1}{2}$ Prs. Butts, Stanley #241

1 Door Close #523.

1 Single Door - Rest Room to Toilet

2-0 x 7-0 x 1 $\frac{3}{4}$ L.H.R.B.

1 Lockset #4664 $\frac{3}{4}$ complete with emergency key, key escutcheon and turn knob #127

1 Pr. Knobs #1852 complete with straight spindle and roses #278

1 $\frac{1}{2}$ prs. butts, 4 $\frac{1}{2}$ " x 4 $\frac{1}{2}$ " - Stanley #241

1 Single Door - Rest Room to Closet -

2-0 x 7-0 x 1 $\frac{3}{4}$ R.H.R.B.

1 Lockset #5639 complete with key escutcheons #812.

1 Pr. Knobs #1852 complete with straight spindle and roses #278

1 Pr. Butts, 4 $\frac{1}{2}$ " x 4 $\frac{1}{2}$ " - Stanley #241.

2 Pairs Doors - Corridor to Gym.

Four - 2-6 x 7-0 x 1 $\frac{3}{4}$ Locks on R.H.R.B. Doors.

- 2 Locksets #563R complete with key escutcheons #812
 - 4 Prs. Knobs #1852 complete with straight spindles and roses #278.
 - 2 Top Extension bolts #1116 R - 12" long
 - 2 bottom extension bolts #1116 R - 12" long.
 - 6 Prs. Butts - $4\frac{1}{2}"$ x $4\frac{1}{2}"$ - Stanley #241
 - 4 Door checks No. 523
 - 1 Single Door - Room #202 to #203
 - 3-0 x 7-0 x $1\frac{3}{4}$ L.H.
 - 1 Lockset #5639 complete with key escutcheons #812.
 - 1 Pr. Knobs #1852 complete with straight spindle and rose #278
 - $1\frac{1}{2}$ Pairs Butts - $4\frac{1}{2}"$ x $4\frac{1}{2}"$ Stanley #241.
 - 3 Access Doors to tunnel in basement
 - 2-8 x 2-8 x $1\frac{3}{8}$
 - 3 Locksets #4934 complete with key escutcheons and 3 keys each - all keyed alike.
 - 3 Prs. Butts - $3\frac{1}{2}"$ x $3\frac{1}{2}"$ - Stanley #241
 - 2 Scuttle Doors - Dressing Rooms to Storage
 - 3-0 x 3-0 x $1\frac{3}{8}$
 - 2 Locksets #4934 complete with key escutcheons, keyed same as access door locks.
 - 2 Prs. butts - 3" x 3" - Stanley No. 808
 - 1 Scuttle - Corridor to Roof
 - Lower Door - 2-4 x 3-0 x $1\frac{3}{8}$
 - 1 Lockset #4934 complete with key escutcheons - keyed same as locks for access doors.
 - 1 Pr. butts - 3" x 3" - Stanley #808.
 - Upper Door -
 - 1 long hook of 5/16 ϕ iron -2'4" long with two eyes - one to use when door is open , other when door is shut.
 - 1 Pr. strap hinges 8" x 8", galvanized with galvanized screws - to be installed under the metal cover.
 - 4 Doors - Kitchen Cabinets
 - 4 Cupboard catches #53, each with strike and turn knob #127.
 - 4 Pairs butts, $2\frac{1}{2}"$ x $2\frac{1}{2}"$ Stanley #241
 - 8 Small Drawers - 8 pulls #807
 - 2 Large Drawers - 4 pulls #807
 - Trophy Case
 - 1 Cylinder Lock #1202 complete with 3 keys.
- Note: Lock to be set under the trim with bolt closing in rabbet in slot for glass.

WINDOWS

7 - D.H. Windows in Basement

13 lifts #430

7 Locks #254

38 - D.H. Windows on First Floor

76 Lifts #830

38 Locks #254

6 - D.H. Windows - First Floor Toilets

12 Lifts #830 N.P.

6 Locks #254 N.P.

48 D. H. Windows - Second Floor

96 Lifts - #830

48 Locks - #254.

290 - GUARANTEE:

All material furnished under this contract which shows defects within one year from date of acceptance shall be removed and replaced by this contractor without additional cost to the Owner. All work so replaced must be in strict accordance with the plans and specifications.

ELECTRIC WIRING

291- - GENERAL CONDITIONS:

The "General Conditions", pages 1 to 15 inclusive, apply to all contracts and form a part of and are included in these Specifications for Electric Wiring.

292- - SCOPE OF THE WORK:

This contract shall include all labor and material required for the complete installation of all conduit, wiring, panel board, cutout cabinet, main line switches and local switches, junction and pull boxes, outlet boxes, receptacles, supports and other miscellaneous electric items for complete electric lighting, power, telephone, signal and time clock system as called for on the plans and required by these specifications.

293- - REGULATIONS AND PERMITS:

This contractor shall take out and pay for all permits and inspection fees by City or Municipal officials.

All materials furnished and methods of installation shall be in accordance with the latest rules and regulations of the National Board of Fire Underwriters.

294- - STANDARDS:

All materials shall conform to the latest standard specifications of the American Society for Testing Materials.

295- - MATERIALS:

Wire. All wire shall be double braided, rubber covered, well tinned, soft drawn copper, having a conductivity of not less than 97 percent of that of pure copper of the specified size.

Wire shall be manufactured in strict conformity with the latest rules and regulations of the National Board of Fire Underwriters. Rubber insulation shall consist of from 18% to 25% of pure paragon.

Wire shall be intermediate grade, commonly known as "Engineers Standard".

Wire shall be the equal of grade specified as manufactured by the Simplex Wire and Cable Company, General Electric Company or the Atlantic Wire and Cable Company.

Conduit shall be General Electric Company's hot dipped galvanized conduit, "Sheraduct" as manufactured by the National Electric Products Corporation or equal as approved by the Architect.

Outlet, Junction, Pull Boxes: All boxes, unless otherwise specified or required, are to be of standard size, 14 ga. hardpressed steel, knock out type, and designed for the purpose for which they are installed, properly coated as specified for conduit to prevent oxidation.

Switches. Switches shall be General Electric Company's #2588, 10 amp, 125 volt, single pole, flush tumbler type with bakelite case.

Plates: Finish cover plates for switches and receptacles shall be of cast brass statuary bronze finish except in toilet rooms where plates shall be chromium plated.

Fuses. Fuses shall be of visible, renewable type as manufactured by the Economy Fuse and Manufacturing Co.

All materials shall be of the best quality and in full accord with the latest and best electrical and mechanical engineering standards. All material and equipment shall bear Underwriters' label.

296 - WORKMANSHIP:

All work under this contract shall be done by mechanics skilled in this trade and all work installed shall be in full accord with the latest and best electrical and mechanical engineering practices and in exact accordance with the latest rules and regulations of the National Board of Fire Underwriters.

297 - SAMPLES:

If this contractor prefers to use any material of different brand or type than that named as a standard in these specifications or if no specified brand or make of material is called for, he shall submit to the Architect for his approval, samples of such material, including plugs, switches, receptacles, fittings, conduit, wire, panels and other apparatus or materials which he proposes to install and these samples shall be approved before proceeding with the work.

298 - SHOP DRAWINGS:

This contractor shall submit to the Architect, for his approval, drawings showing runs of all conduit as he proposes to install them, also conduit sizes, and size and number of wires to be drawn into them. Shop Drawings shall also show size and location of pull boxes.

The shop drawings shall furthermore cover the details of construction of the distribution centers and cutout cabinets and such other apparatus as may be required in the building, all in accordance with the latest rules and regulations of the National Board of Fire Underwriters as hereinbefore specified.

299 - MEASUREMENTS:

Approximate location of outlets, etc. shall be taken from the small scale drawings. Exact locations shall be determined from large scale or full size details or from measurements furnished by the Architect. All dimensions shall be verified and all work located from measurements taken at the building.

300 - CHANGING OUTLETS:

When necessary to fit and center with paneling, trim, or the like, this contractor, shall at his own expense, shift the lighting fixtures or other outlets as required by the Architect.

301 - CUTTING, FITTING AND DRILLING:

This contractor shall do all cutting, fitting, patching and finishing of rough work necessary to the proper installation of all apparatus, material, and equipment included in this contract. Cutting, fitting, etc. of finish work shall be done by the contractor who installed it.

702 - SYSTEMS:

The lighting service will be three wire, 110-220 volts, 60 cycle, single phase, alternating current.

The Power Service will be 220 volts, 60 cycle, three phase, alternating current.

303 - CONDUIT:

Conduit shall be required for all wiring required under this contract.

Conduits are to be continuous from outlets to outlets and from outlets to cabinets, junction boxes and pull boxes, forming a complete raceway from the service entrance on the exterior to all outlets in the system. Conduit must enter and be secured to all cabinets and boxes with lock nuts and terminal bushings in order that each system shall be electrically continuous from the switchboard to all outlets.

All joints in conduit shall be cut square, reamed smooth, threads coated with white lead and screwed into couplings until ends butt solidly together forming a water tight joint.

Conduit must be of sizes as will permit the ready insertion and withdrawal of conductors without abrasion and in no case shall conduits be smaller than the minimum sizes allowed by the National Board of Fire Underwriters.

All conduit in finished and plastered spaces shall be concealed in walls and floors at a depth sufficient to prevent interference with or staining of finished coatings. Conduit in floors, shall in general, be run on the lower side of the steel joists where runs are perpendicular to the joist and above the furring channels where runs are parallel to the joist. Conduit shall be run in such manner as not to interfere with the installation of the of the metal/furring for the ceilings. Conduit installed under joist where the lower furring channels are directly against them shall be supported on pipe clips bolted to bottom of joist or with #9 wires embedded in the concrete slab above. Supports shall be spaced not over 6'0" o.c. Conduit installed under joist perpendicular to the furring channels may be supported directly on them without additional supports. in unfinished spaces.

Conduit shall be run concealed in walls and slabs wherever possible. Where this cannot be done as in the unfinished basement, Gymnasium, etc. they may be run exposed, in which case, they may be firmly secured in position throughout their length by pipe straps secured to steel framing or another approved substantial means.

All bends and offsets shall be avoided where possible and where same are made an approved hickey or a conduit bending machine shall be used. The use of a pipe tee or vice will not be permitted.

All conduit is to be run with long bends, having a radius of turn on inner edges of not less than $3\frac{1}{2}$ diameters of the conduit.

The entire conduit system must be installed complete before any conductors are drawn in. Each run of conduit must be completed before the plastering is finished to guard against obstructions. No. 14 galvanized iron or steel fish wires are to be left in telephone conduits in which conductors are not furnished and drawn in under this contract.

All conduit must be swabbed out and all moisture removed before any wires are pulled in and in case of conduit for telephones, all moisture must be removed and fish wires pulled in at about the same time wood trim is being installed or at such time as directed by the Architect.

Ends of all conduit shall be closed with metal caps and conduit kept clean until wire is pulled in.

Conduit shall be run at such a time and in such a manner as not to delay or interfere with the progress of other work.

Each conduit system - power, light, telephone and signal shall be grounded to the water service pipe with #10 wire in $1\frac{1}{2}$ " conduit. Connection to water pipe shall be made with Crouse-Hinds type G.C.E. Groundulet.

304 - OUTLET, JUNCTION AND PULL BOXES:

Lighting outlet boxes are to be $3\frac{1}{4}$ or 4" in diameter, deep type where possible, without covers, but provided with fixture studs. Where larger size may be required, they must be approved for use before placing. Switch outlet boxes are to be rectangular and single or gang and they must be of sufficient depth to permit the installation of flush type, single pole, tumbler switches equipped with wall plates, and shall be provided with screw holes for securing the wall plates and switches in place.

Junction and pull boxes shall be of sizes required and shall be equipped with covers fitted in place with screws. The covers for boxes are to be finished for painting. In all cases the boxes must be appropriate and approved by the Architect for the location in the service for which they are installed and must be of sufficient size to permit all connections being made without grounding or breaking soldered joints.

Outlet boxes are to be securely fastened to support heavy fixtures. Ceiling outlet boxes shall be supported by the conduit lines where two or more are secured to the box or in cases where only one conduit occurs, stubs of conduit resting on the furring or supported from the slab above shall be used. Wall outlet boxes shall be supported in the same manner except that conduit (or stubs of conduit) shall be built in the masonry walls or partitions.

All switch boxes are to be about 4'6" from the finished floor. In centering outlets, contractor is cautioned to allow for window trim, door trim, chair rail, paneling, etc. and any inaccuracy resulting from failure to do so must be corrected by the contractor at his own expense.

In finished spaces the tops of boxes with or without covers must be made flush with finished plaster, wainscot lines, face of cabinet work, etc. All outlet boxes must be located in accurate alignment with the face of the walls as indicated on the drawings. Covers of junction and pull boxes must be square with the rooms or other spaces. Where covers are exposed they shall be either solid brass similar to finished plates or finished iron for paint as directed.

Each outlet box for ceiling lights over the basketball court in the Gymnasium shall be bolted to the truss with a 3/8" bolt extending through the bottom of the box and between the angles of the lower cord, securely holding the box in place.

Boxes to house receptacles for footlights, border lights and moving picture machine shall be as hereinafter specified.

305 - LIGHTING CUTOUT CABINETS:

Cut-out cabinet for lighting service shall be made from one piece of code gauge sheet steel, flanged or lapped at four corners and riveted, with a 3/4" flange turned inwardly all around outside edge. Box shall be provided with not less than three inch gutter space all around panel and shall be of sufficient depth for the installation of panels with switches, bus bars, fuses, etc. to permit the closing of doors to panels with switches either open or closed. Box to be drilled for number of feeders, circuits and outlets required and all conduit shall be bushed and lock nutted to box in first class manner.

Box is to be designed for flush wall mounting. Box shall be equipped with a steel front complete with safety two door construction made from a single sheet of code gauge steel. Door shall be cut out leaving a trim of the proper width all around the door. A steel return extending to

face of panelboard shall be spot welded to the inner edge of the trim, acting as a barrier between panel board and gutter, and forming a 1/4" rabbet for the floor.

Front for cabinet box shall be about 5/8" larger than box. Doors shall be provided with heavy brass flush hinges only. Door over fuses shall be equipped with a cylinder lock with three keys. Door over switch compartment shall have catch locks only.

All parts of cabinet, including door and frame shall be finished in dull black enamel.

Cabinets shall be or be equal as approved by the Architect to those made by the Frank Adam Electric Company of St. Louis, Mo. for their type T.P. safety panel with main line fuses.

306 - LIGHTING PANEL BOARDS:

All circuits for lighting service shall be controlled from a type T.P. safety panel board with fused mainline, all as manufactured by the Frank Adam Electric Company of St. Louis, Mo. Panel board shall consist of molded composition units, each complete in itself, carrying two tumbler switches for branch circuits with connections for plug fuses and equipped with card holders, circuit connections, barriers, etc. . Units shall be bolted directly to the bus bar of the mains, which shall be supported on a code gauge steel back. The base of switches shall be unbreakable composition, impervious to moisture and without mineral veins.

All current carrying parts shall be made of the best grade of hard drawn copper of 98 percent conductivity and shall be spaced in accordance with the latest requirements of the National Board of Fire Underwriters. Current carrying parts shall be of such size that the maximum current density shall not exceed 1000 amperes per sq. in. of cross section.

All branch circuits shall be arranged for mounting fuses between switches and outgoing circuits.

Circuit switches shall be 30 ampere, 250 volt, tumbler switches.

Each complete switch unit shall be mounted in such manner that it can be easily removed or replaced if necessary.

Each branch circuit shall be neatly labeled.

Circuits shall be provided for the footlights and border light outlets on the stage.

307 - POWER DISTRIBUTION:

Power distribution will be three phase, 220 volt, 60 cycle, A. C. throughout.

A separate fused safety switch shall be furnished and installed in the boiler room for the manual control of the vacuum pump motor, for the motor operating the stoker, for ejector pump motor, for the two motors connected to the unit heaters, for the group of univent motors and for the refrigerator motor and cooking equipment. Each switch shall be or be equal as approved by the Architect to Trumbull Electric Company's Type "A" fused safety switch. Power feeders shall be started at the safety switches called for above and be extended to each power circuit as shown on the plans and as herein specified. A convenience receptacle, as hereinbefore specified for lighting shall be furnished and installed back of the refrigerator for connections to the refrigerator motor. A convenience outlet for the power circuit shall also be installed on the wall as indicated on the drawings. Connections for ovens in the Domestic Science Room shall be made complete from the safety switches to the outlets for the ovens on tables. Tables and ovens to be furnished by the Owner. Wiring for power shall be complete, including connections to motors, automatic control equipment, etc. Motor outlets shall be as follows:

11 Univent Outlets	0 0 - - - -	3/4 H.P. each
2 Unit Heater Outlets	- - - -	1/2 H.P. "
1 Stoker	- - - - -	2 H.P.
1 Vacuum Pump	- - - - -	1 H.P.
1 Refrigerator Motor	- - - -	1/3 H.P.
16 Ovens	- - - - -	-3000 Watts each
1 Convenience Outlet	- - - -	-1000 "
1 Ejector Pump	- - - - -	-3/4 H.P.

The above list of power equipment shall be used in determining the size of the safety switch, conduit, wire, etc.

308 - SERVICE:

This contractor shall furnish and install a main line safety switch similar to those called for above to control power outlets on the south wall of the boiler room at the location indicated on the drawings. . From this point he shall extend a conduit line across under the first floor system and then up the north wall to the roof level where he shall install a Crouse-Hinds Type "F" waterproof fitting at the end of the conduit. Conduit shall be secured to the safety switch with lock nut and bushings. Safety switch shall have sufficient capacity to carry the entire power and light load. This contractor shall make all necessary provision for mounting meter above

and at the side of the main line safety switch. One line of conduit shall be extended from near the power meter to the safety switches controlling the branches to the power outlets. Another line shall be installed from near the meter for lighting service and extend to the lighting out-out cabinet on the first floor. This contractor shall furnish and install service wire from the main line switch to the conduit fitting at the upper end of the conduit for service lines where sufficient slack shall be left for connection to the Service Company's lines.

309 - WIRING:

Contractor shall submit samples of wire he proposes to use, and must secure the approval of the Architect in writing before any wire is ordered.

No wire smaller than No. 14 is to be installed for general lighting. All wire No. 8 and larger must be stranded.

All stranded wire must be soldered into cup lugs at terminals.

No wire shall be drawn in until plaster is dry and conduit free from moisture.

Conductors shall be continuous from outlet to outlet and no splices shall be made except in outlet or junction boxes. All feeders and branches shall be of such capacity that with 90 percent of the lights in the building burning the drop in voltage from the Service Company's mains to any light outlet shall not exceed three percent.

Sufficient slack shall be left in all outlets to permit the connection of fixtures, motors, etc. Splices shall be made both mechanically and electrically perfect. Splices shall be made by cleaning and twisting the wires solidly together, then soldering and adding rubber and friction tape to a total thickness of $1\frac{1}{2}$ times that of the original insulation.

All wire shall bear Underwriters label and date of manufacture.

310 - CIRCUITS:

All wiring shall be laid out in such manner that the load on any branch circuit shall not exceed 1200 watts.

311 - SWITCHES:

This contractor shall furnish and install switches as hereinbefore specified at all locations shown on plans for controlling lights in all rooms, corridors, etc.

Two, three or four switches for controlling outlets from more than one point shall conform in construction and design to the general requirements specified for single pole switches.

Switches in groups shall be mounted in single or double horizontal rows with gang plates as approved by the Architect.

Switches shall be mounted solidly in the boxes and not supported on the switch plates.

Lights, in general, shall be controlled from switches as noted on plans. Lights over the basket ball court in the Gymnasium, over and under the balcony, all lights in the main corridors on the first and second floor and all emergency or exit lights in the Gymnasium shall be controlled in groups from switches on the main panel board as indicated on the plans.

The 3000 watt outlets at the upper part on either side of the stage and the footlights shall be controlled from a group of switches as indicated on the plans.

Each of the 3000 watt outlets shall be controlled from three switches. The footlights shall be in five ft. sections as indicated. Each section shall be controlled from three switches. A group of twenty-one switches shall be required at this point. A piece of 3/4 inch conduit 11 inches long shall extend from the back of each switch box through to the wall into the stairway to the Agricultural Laboratory. Each piece of conduit shall be capped in the stairway and the opposite end secured to a switch box with bushing and locknut. Above conduit will be used for connecting border and footlights to future dimmers.

312 - RECEPTACLES:

All receptacles, except as otherwise noted, shall be duplex convenience outlets as hereinbefore specified. Receptacles shall be installed with full seat on outlet boxes or plaster and not carried on the switch plates.

313 - DROP CORDS:

Drop cords shall be installed in Agricultural Laboratory, corridors, germinating, boiler and fuel rooms in basement, in janitor's closet, vault and closet #109-A on first floor and in storage rooms and closet #205-B on second floor. Drop cords shall be made up of box cover, reinforced cord, porcelain key socket and cord adjuster. Cord in case shall be approximately 3'0" long.

314 - LAMPS:

All lamps will be furnished and installed by the Owner.

315 - FUSES:

This contractor will furnish and install all fuses required for apparatus furnished under this contract.

All fuses to be of visible renewable type as manufactured by the Economy Fuse and Mfg. Company or the equal in the opinion of the Architect. All fuses shall bear Underwriters' labels. All main line lighting fuses and all power fuses shall be of the cartridge type; all others shall be plug fuses with screw base.

316 - TIME CLOCK SYSTEM:

This contractor shall furnish and install all conduit, outlets and wiring complete for an A. C. Constant Service Electric Clock System with outlets for Master Clock, fourteen secondary clocks, four gongs, etc. as called for on plans and as herein specified. All outlets shall be located approximately 10'8" above the floor and as indicated on the plans. Secondary clocks will not be furnished under this contract but all conduit and wiring will be installed, and connections for their installation later. All outlet boxes for secondary clocks shall be capped. This contractor shall furnish and install the following equipment for the system:

- 1 Master Clock
- 1 two circuit program device.
- 4 six inch corridor gongs
- 1 Power unit and transformer.
- 1 Reserve power unit.

All equipment shall be or be equal as approved by the Architect to that manufactured by the Standard Electric Time Clock Company.

All wiring and conduit work shall be in accordance with the standard practice of the manufacturer of the clock system. Conduit shall be as hereinbefore specified for power and light service except that it may be only single braided. Splices, etc. to be as specified for power and lighting. All wires shall be No. 14. Wiring, in general, shall be as follows:, with secondary clock outlets arranged on two multiple circuits:

- 2 - #14 wires between power unit and reserve power unit
- 2 - #14 " " " " " Master Clock
- 2 - #14 " " Master Clock & each clock circuit
- 2 - #14 " " " " & each bell circuit
- 2 - #14 " " " " & transformer.

The power unit, reserve power unit, and transformer shall be installed in the basement as indicated on plans. Power equipment noted above shall have sufficient capacity for com-

plete system when all secondary clocks, etc. are installed.

The master clock shall be installed in the principal's office on the first floor and shall be one (1) 60 beat, self-winding master clock with 12" dial having Roman numerals, wood rod, metal ball pendulum with control equipment, relays, setting keys and switches for the operation of all secondary equipment.

The program clock or device shall be installed in the case of the master clock and shall consist of a two-circuit minute interval program device equipped with an automatic calendar drum arranged for silencing the bells during any twelve hour period desired and to automatically change from one ringing schedule to another. Program device shall be equipped with separate relays and buttons so that any program circuit may be sounded with the use of the buttons independent of the master clock.

This contractor shall arrange with the manufacturer to check and adjust the installation and make final connections to the master clock.

317 - TELEPHONE:

This contractor shall furnish and install a 1/2" conduit from near the location hereinbefore specified for the entrance of power and light service lines with waterproof conduit fitting at top and extend and connect to a 4" x 6" x 4" junction box in the boiler room for telephone service wires. A 1/2" conduit shall also be installed from the junction box in the boiler room to the outlet in the principal's office and extended through to the outlet in the teachers' rest room. Switch boxes as hereinbefore specified shall be installed as outlet boxes for telephones. Coverplates as specified for switches shall be provided for each box except that each shall have one 3/8" rubber bushed opening instead of opening for handle of switch.

All wires for telephone service will be furnished and installed by others. A standard switch box shall be installed 3" to one side of the telephone outlet in the Superintendent's office and the two connected with 1/2" conduit.

318 - LABORATORY OUTLETS:

This contractor shall furnish and install a 30 ampere safety switch on the south wall of the boiler room and extend one 1/2" conduit from the switch to the lighting cutout cabinet box on the first floor and another

from the switch to the laboratory outlet box in the Science Laboratory. The outlet box in the Science Laboratory shall be approximately $2\frac{1}{4}$ inches deep, $3\frac{3}{4}$ inches high and 18 inches long. Eight $1\frac{1}{2}$ inch conduit shall be connected to the outlet box and extended to the table outlets as indicated on the plans. Safety switch shall be the same as those heretofore specified for controlling power outlets. Outlet box in Science Laboratory shall be the same as those called for in Article No. 292. Conduit shall be connected to boxes with locknuts and bushings. Conduit at table outlets shall be capped at a height of 1'0" above the floor. No wire will be required under this contract for laboratory outlets.

319 - FOOTLIGHTS, STAGE POCKETS, ETC:

This contractor shall furnish and install five (5) sections of type D-34 footlights as manufactured by the Major Equipment Company of Chicago, Illinois in the spaces provided for them in the stage floor. All framing required for them shall be installed by others.

Each section shall be a complete five ft. unit including wiring, splice boxes, wood trim, springing wood cover, wiring box; all wiring for three colors and three circuits, and automatic disconnect switch for each circuit. Each section or unit shall also include individual copper spun chromium plated reflector unit, with four red, four clear and four green heat resisting lenses with fastening rings. This contractor shall also furnish and install three gang, flush mounted, wall pockets in each location where 3000 watt outlets are called for at the side of the stage. Each shall be complete with receptacles in sheet metal case and three plugs. All single wall pocket with plug shall also be installed in the moving picture booth. All pockets shall be or be equal as approved by the Architect to Major wall pockets as manufactured by the Major Equipment Company.

Footlights and wall or stage pockets shall be controlled by switches as called for in Article No. 311.

320 - CALL SYSTEM:

This contractor shall furnish and install a complete return call system between the Superintendent's office and the boiler room, using the telephone conduit as a raceway for the wires and the junction and outlet boxes of the telephone system for pull boxes. The buzzer and push button in the Superintendent's office shall be mounted in the box at the side of the telephone outlet. A similar box shall be mounted at the side of the junction box in

basement to receive the push button and buzzer. Power for the buzzer system shall be furnished by the transformer for the time clock system. Buzzers shall be similar and equal to #137 as manufactured by Edwards and Co., Inc. 140th and Exterior Streets, N. Y. with buzzer mounted on the back of a perforated plate.

Wire shall be office wire, 19 ga. copper wire, insulated with one wind and one braid of cotton woven tight and saturated with paraffin as manufactured by the American Steel and Wire Company. All connections shall be electrically tight.

331 - HEAT CONTROL SYSTEM:

This contractor shall install a 100 watt flush outlet on the south wall of the boiler room for the heat control system, which will be furnished and installed by others. Box shall be provided with a plain cover and ends of wire separated and taped.

332 - FIXTURES:

This contractor shall wire all outlets complete and ready for fixtures with all wires properly identified, etc.

All fixtures, however, will be furnished and hung under another contract.

333 - PROTECTION:

This contractor shall carefully protect all work installed by him while the building is under construction. He shall install his work at such time and in such manner as to avoid damage, but not delay the work of other crafts. He shall close all conduit lines with tin blanks under the terminal bushings until wires are pulled in. After the wires are pulled in, all outlet boxes shall be filled with paper until the switches, receptacles, fixtures, etc. are installed.

This contractor shall also carefully protect finish plaster, floors, trim, etc. installed by other contractors while installing this work and shall repay the expense of replacing any work so damaged.

334 - CLEARING SITE:

This contractor shall leave all work installed by him clean and perfect in every respect and upon completion of his work shall immediately remove all his surplus material, tools, equipment, debris, etc. from the premises.

325 - GUARANTEE:

All work installed under this contract which shows defects within one year from date of acceptance shall be removed and replaced by this contractor without additional cost to the Owner. All work so replaced must be in strict accordance with the Plans and Specifications.

PLUMBING

326 - GENERAL CONDITIONS:

The "General Conditions" pages 1 to 15 inclusive, apply to all contracts and form a part of and are included with these specifications for Plumbing.

327 - SCOPE OF THE CONTRACT:

This contract shall include the furnishing and installing of a complete plumbing, sewerage and draining system, including footing drains, storm sewers, floor and area drains, sanitary sewer, septic tank and lines, soil, waste and vent pipes, cold water pipes, hot water pipes, valves, fittings, hangers, traps, plumbing fixtures, water heater, pipe covering, ejector pump, etc. and other items as hereinafter specified.

328 - PERMITS, FEES, ETC:

This contractor shall take out all permits and pay all fees for permits, inspection, etc. as required by City or Municipal Authorities.

329 - REGULATIONS:

All work in this contract shall be in strict accordance with the laws and ordinances of the Town of Maroa and the State of Illinois governing the installation of Plumbing, sewers, etc.

330 - STANDARDS:

All materials herein specified shall be new and furnished in accordance with the standard specifications of the American Society for Testing Materials, the American Society of Mechanical Engineers and the American Specification Institute as they may apply.

331 - MATERIALS:

All material shall be new and of best quality and design.

Tile Pipe: All tile pipe for storm and sanitary sewers shall be first quality vitrified hub sewer tile, glazed inside and outside, sound and hard burned throughout their thickness, free from cracks, flaws, blisters, fire checks and other imperfections which may impair their value.

The pipe for footing drains shall be as called for above except they shall be of sound quality. Tile pipe for lines from the septic tank shall be of standard grade field tile. Overflow line under the tile from the septic tank shall also be of field tile.

Portland Cement: The cement shall be Portland Cement fulfilling the requirements of the latest standard specifications adopted by the American Society for testing Materials and the United States Government and of brand acceptable to the Architect.

Sand: Sand shall be clean and well graded sand passing a 1/8" screen and containing no injurious amount of organic or other deleterious matter and not over two percent of clay by weight.

Cast Iron Pipe: All cast iron pipe and fittings shall be made of close grained gray iron, smooth in the inside, free from flaws, sand holes or other defects and of uniform thickness. All cast iron pipe and fittings shall be "extra heavy", made by standard manufacturer and the average weight of each pipe shall not be less than the following:

2 inch pipe	5 $\frac{1}{2}$ pounds per foot
3 " "	9 $\frac{1}{2}$ " " "
4 " "	13 " " "
5 " "	17 " " "

All cast iron pipe and fittings shall be coated inside and outside with asphaltum. Both pipe and coating shall be heated to a temperature of 300 degrees F. before the castings are dipped.

Wrought Iron Pipe: All pipe specified to be wrought pipe shall be standard "Merchant" steel pipe, full standard weight and size, galvanized inside and outside, and shall be the equal of that manufactured by the National Tube Company. All fittings shall be of malleable iron, galvanized, and be of standard weight and free from flaws and defects of any kind.

Genuine wrought Iron Pipe: Genuine wrought iron pipe shall be equal of "Byers" genuine wrought iron pipe, full standard weight and size, galvanized inside and outside. All couplings, nipples and short lengths of pipe shall be of same material as pipe and all fittings shall be of malleable iron, galvanized and be of standard weight, free from flaws and defects of all kinds. All genuine wrought iron pipe and nipples shall be marked with standard marking of Company making pipe.

Brass Pipe. All brass pipe and nipples shall be seamless, drawn brass pipe, of standard iron pipe sizes weighing not less per foot than that given in the following table. Brass pipe shall be equal to that manufactured by the American Tube Works, Boston, Mass..

1/2 inch	- - - - -	.90 pounds
3/4 "	- - - - -	1.25 "
1 "	- - - - -	1.70 "
1 1/4 "	- - - - -	2.50 "

Brass tubing: For exposed waste; vents, and traps shall be of not less than 16 ga. tubing nickel plated.

Lead Pipe: All lead pipe, including bends and traps shall be of the best quality of drawn lead pipe, weighing not less per lineal foot than that shown in the following table:

1 inch	- - - - -	3 Pounds 8 Ounces
1 1/4 "	- - - - -	3 " 0 "
1 1/2 "	- - - - -	4 " 0 "
2 "	- - - - -	5 " 0 "
3 "	- - - - -	6 " 3 "
4 "	- - - - -	8 " 0 "

Valves: All shut off or control valves, not specified otherwise hereinafter shall be gate valves of Crane manufacture or equal. Valves 2" or less in diameter shall be of brass, the equal of Crane's #440 1/2. All valves above 2" in diameter shall have iron bodies with brass working parts and be equal to Crane's No. 461.

Check valves shall be Crane's #34 1/2 brass body and parts and leather disc.

Inserts: All inserts for securing pipe hangers to concrete shall be equal to those made by the Truscon Steel Company of Youngstown, Ohio and shall be of the tapped, slotted, continuous or adjustable type as required by conditions. All shall be for 5/8" bolts.

Expansion Bolts: All expansion bolts shall have threaded double tapered brass coves surrounded by sleeves of hard lead all as manufactured by the Ackerman-Johnson Company of 625 West Jackson Blvd., - Chicago, Illinois.

In reinforced concrete work, cone must be set to greater depth than reinforcing and in brick work, cone must be set at least 2" from face of wall. Cone must be securely driven in place with driving pin before bolt is tightened. Sleeve of pin shall be fitted over

bolt extending from expansion sleeve to face of wall.

Hangers: Ring hangers shall be or be equal as approved by the Architect to those manufactured by the Grinnell Company of Providence, Rhode Island. They may be of the split ring type or solid type as preferred for cast iron pipe.

Hangers shall be connected to inserts or expansion bolts in ceiling with 3/8" pipe for single water line of 3/4" pipe or less. For all single pipe over 3/4" and for trapeze hangers 1/2" pipe shall be used.

Fixture, Floor and Shower Drains, Etc. shall be as hereinafter specified.

All wrought iron, genuine wrought iron and brass pipe shall be tested at the Factory to 150# per sq. in. hydrostatic pressure.

332 - WORKMANSHIP:

These specifications and accompanying drawings contemplate a complete and high grade installation of plumbing, sewerage and gas fitting, in which there will be used new and perfect material and apparatus of the latest and best design and manufacture, in which all workmanship shall be thoroughly first class and complete, both in effectiveness and appearance whether concealed or exposed, and shall be exercised by none except experienced workmen.

333 - DRAWINGS AND SPECIFICATIONS:

The drawings show the location and arrangement of fixtures, etc. but do not show or indicate fittings, valves, etc. required. Drawings and specifications are complementary and shall be followed in installing the system.

The dimensions and scaled proportions given on the drawings are in accordance with the present intentions, but as variations may occur in the construction, the contractor must make his own measurements at the premises and the building, and he shall be responsible for any errors which could have been avoided by such checking and inspection.

This contractor must be particularly careful that there is no encroachment by others on space necessary for the installation of his work.

334 - CHANGING OUTLETS:

When necessary to fit and center with marble, plaster or other surfaces of wall spaces, contractor must, at his own expense shift the plumbing fixture outlets or other outlets installed under this contract as directed by the Architect.

335 - CO-OPERATION:

This contractor shall exercise every reasonable effort to assist the Owner and other contractors in installing their work, by furnishing exact locations of pipes, fixtures, runs, chases, setting inserts, sleeves, etc. and furnishing whatever information that might be of assistance, also by installing his work at such time as not to interfere with the work of other contractors.

He shall furnish and set all necessary thimbles and sleeves in floors and walls, and lay out chases in the walls for the mason, and failing to do so, he shall do such cutting, patching, etc. at his own expense.

In running soil, waste, vent and supply lines, the location of heating pipes and other work must be taken into consideration and plumbing laid out in conjunction with them so as to allow every thing to work in correctly.

336 - CUTTING AND FITTING:

This contractor shall do all necessary cutting of rough work, not impairing the strength of the building required to properly install the materials furnished under this contract.

All cutting and fitting required in finished materials for the proper installation of the plumbing work will be done by the respective sub-contractors furnishing and installing these materials and in no case shall this subcontractor do any cutting of finished work except that installed by him.

337 - OPENINGS THROUGH WALL AND FLOORS:

Sleeves of 26 ga. galvanized iron shall be installed in walls and floors wherever pipes pass through them. Sleeves shall be maintained in proper position until built in. Floor sleeves shall be filled with sand before concrete is poured.

338 - JOINTS:

Joints in vitrified tile pipes, except for footing drains shall be made by first inserting a tightly twisted ring of oakum, calking, then filling remainder of joint and forming a ring 3" wide and 1" thick around the joint, with mortar composed of equal parts of Portland cement and clean sand. The joints must be pointed carefully on the outside and the pipe left clean and smooth on the inside.

Joints in vitrified tile pipe footing drains shall be made by placing tile closely together in them, inserting a small tightly twisted ring of oakum to center pipe and exclude dirt. Joints in overflow lines from the septic tank shall be left open. Tile however, shall be set closely together.

Underground joints between vitrified tile and iron pipe shall be made by turning the iron pipe into the hub of the tile and calking the joint with a ring of oakum and a collar of Portland cement three inches thick and at least twelve inches long extending all around the pipe.

All joints in cast iron pipe shall be made by first inserting oakum and thoroughly calking it in place, then following with pure molten lead well calked. Lead shall be not less than one inch deep, and be brought to top of hub and faced. No paint, varnish or putty will be allowed in the joints.

Joints in wrought and "Genuine wrought" iron and brass pipe shall be standard screw joints, and all burrs and cuttings shall be removed. Dies shall be sharp and accurately set and the exact number of threads cut on each pipe to form a perfect joint. Joints shall be made up tight with not more than one turn of threads projecting from the fitting. All screw joints shall be made with white or red lead. All pipe shall be reamed, stood on end and all sand, dirt, etc. removed before assembling.

Connections between screw joint pipe and cast iron sewers shall be made by screwing a short piece of coupling or calking ring on the threaded pipe and calking into hub of cast iron as above specified for joints in cast pipe.

Joints in lead pipe or between lead or brass pipes shall in all cases be wiped joints.

Connections between lead and cast iron pipes shall be made with brass ferrule, wiped to lead pipe and calked with oakum and lead into hub of iron pipe.

Connections between lead and brass or wrought iron pipe shall be made with brass ferrule, wiped to lead pipe and screwed to fittings for brass or wrought pipe.

All junction of soil and waste pipes and all connections between fixtures and soil and waste pipes shall be made with combination "Y" and 1/8 bends where possible, otherwise with sanitary "T" branches.

339 - EXCAVATING AND BACK FILLING:

This contractor shall do all excavating and back filling for the septic tank, pump pit, storm and sanitary sewers and for connections from footing drains and floor drains to the pump pit, etc. Excavations shall be made only large enough to properly place the pipe and make up the joints, and shall be made to exact elevations, permitting the tile to rest on undisturbed tile. Excavation shall be made for hub and cement ring of glazed tile and for joint between cast iron and glazed tile. No trenches shall be back filled until the work has been inspected and approved. All back filling shall be placed in even layers and thoroughly tamped, soaked and compacted into place. Storm sewers shall be at least 3'6" below finish grade. Sanitary sewers shall be installed at a minimum, uniform grade of 1" in 10' or more where possible. Field tile from the septic tank shall be installed to a grade of 6" in 100'.

340 - DRAIN TILE:

This contractor shall furnish and install 4" tile on top of footings around the outside walls of the building as called for on the drawings. Tile shall be salt glazed, hub tile, as hereinbefore specified, laid tightly together and calked with oakum as called for in Article No. 321. As soon as the tile has been inspected and approved, it shall be covered with cinders, etc. by others, as called for in Article No. 44. All changes in direction shall be made with special tile, 1/8 bend, 1/4 bend, etc. and all branches and connections shall be made with tees or Y's. Drains shall be laid level on top of the footings at the different elevations and connected to the sump as noted on the plans. Joints in tile inside the building shall be cemented as specified for sanitary sewers.

Excavations for footings and foundation walls will, in general, be wide enough for footing drains to be installed without additional excavation. All excavation required, however, including that for drains inside the building, shall be done by this contractor; he shall also back fill over the section inside the building, puddling all earth compactly in place to avoid settlement.

341 - SANITARY SEWERS:

This contractor shall furnish and install sanitary sewers from the septic tank west of the building to all soil and waste lines as noted on the plans.

Sizes of sewers shall be as called for as on the plans. All sanitary sewers from the septic tank to within five feet of the foundation walls shall be of salt glazed tile. All sewers inside the building and to the point on the outside noted above shall be of extra heavy cast iron pipe. All joints in the tile pipe, cast iron pipe and between cast iron pipe and tile pipe shall be made as hereinbefore specified for joints in Article No. 338.

Exterior sanitary sewers shall be installed at a minimum depth of 3'0" below grade and to a true and even grade. All changes in direction and all connections shall be made with 1/8 bends and Y's. Each connection between cast iron sewers and vertical soil waste lines and each change in direction of sewers inside the building shall be made with 1/8 bends and Y's with cleanouts extending to floor level. Cleanout lines shall be equipped with brass calking ferrule and recessed brass screw clean out plugs brought to exact floor level. Cleanouts shall be placed in accessible positions, extending lines, if necessary to accomplish this. All cleanouts shall be same size as pipe in which they are installed up to and including 4". Grade to sewers to be as hereinbefore specified.

342 - SEPTIC TANK:

This contractor shall furnish and install a concrete septic tank as indicated on the plans. The tank shall be built monolithically with two compartments. The bottom of the tank, sides, division wall and top shall each be 6" thick.

The primary or receiving tank shall be 5' x 7'-6" and the secondary or overflow tank shall be 3'-0". Each section shall be 4'0" deep.

A concrete barrier $2\frac{1}{2}$ inches thick shall be installed in the receiving tank. The barrier shall extend the full width of the tank and from the top of the tank to two inches below the top of the division wall.

All concrete shall be mixed in the proportion of one part cement to two parts coarse sand and three parts clean gravel. All sides, division wall and top and bottom slabs shall be reinforced with $\frac{3}{8}$ inch round bars as noted on plans. The tank shall be installed with the top of the tank 1'6" below grade. A 20" extra heavy catch basin cover and ring shall be installed over each section. Ring cover shall be flush with top of slab and covered with earth. An extra heavy cast iron sanitary tee shall be cast in the end of the receiving tank near the top and connected to the sanitary sewer. The side opening of the tee shall extend down below the level of the liquid in the tank. The end of the tee shall be closed with a cleanout plug as hereinbefore specified for sanitary sewers. A similar tee fitting shall be installed at the outlet of the overflow section of the tank with the side outlet extending down. The outlet tee shall be $1\frac{1}{2}$ inches below the level of the inlet tee. The top of the division wall shall be exactly $\frac{1}{2}$ inch above the level of the flow line of the outlet tee. The disposal lines of 4" form tile shall be connected to the outlet tee and extended as indicated on the plans. A line of 4" field tile shall be extended across under the disposal lines and connected to the storm sewer. The field tile shall be back-filled to a depth of 1'0" with cinders or gravel; remainder of backfill shall be of black or mixed soil. The line of field tile extending across under the disposal lines shall be approximately 1'6" below them. The space between the lines where they cross shall be filled with cinders or gravel.

343 - STORM SEWER:

This contractor shall furnish and install storm sewers from the tile in the field west of the building to all downspouts and to outlet from the ejector pump as shown on the plans. All storm sewers five feet outside the building lines shall be of vitrified hub tile as hereinbefore specified. Storm sewers, five feet from building lines to downspouts and to connection from ejector pump shall be of extra heavy cast iron pipe.

All changes in direction shall be made with $\frac{1}{8}$ bends - not with $\frac{1}{4}$ bends or broken tile. All joints between tile pipe, between tile pipe and cast iron pipe, between sections of cast iron pipe and between cast iron pipe and cast iron leader boots shall be made as hereinbefore specified for joints. All pipe shall be installed to a true and even grade with the maximum pitch available.

Floor and area drains shall be connected to the sump in the boiler room with tile pipe as specified above for storm sewers.

344 - SUMP:

This contractor shall furnish and install a sump in the boiler room as noted on the plans. Sump shall be constructed of two sections of 36" diameter sewer pipe as hereinbefore specified. Tile shall be set on a base of concrete 6" thick. Lower tile shall be placed before the base slab has set and be securely cemented in place. Joint between tile shall be calked and cemented; both upper and lower joint shall be made water tight. The top of the upper tile shall be flush with the bottom of the basement floor slab. The basement floor slab shall be extended over the tile and formed to receive the pump base. All inlets to the sump shall be carefully made and the space about the incoming tile cemented to exclude all water except that entering through the drainage lines.

345 - SUMP PUMP:

This contractor shall furnish and install a size 2-63 sump pump as manufactured by the Economy Pumping Machinery Company of Chicago, Illinois. Pump shall be complete with pipe, cast iron base, 1150 R.P.M., 3/4 H.P. motor, etc. Base shall be fitted and bolted to the concrete floor over the sump. The pump shall be equipped with removable bronze bearings, ground shaft and micrometer adjusted ball thrust bearing. Motor shall be designed for vertical installation and be equipped with automatic float starter, float, etc. Pump shall have a capacity of fifty gallons per minute against a discharge head of 10 ft. Wrought steel galvanized pipe as hereinbefore specified shall be installed as discharge line from the pump to the sewer.

346 - LEADER BOOTS:

Extra heavy cast iron pipe shall be furnished and installed as leader boots forming a part of the storm sewer system as called for above in Article No. 343. Top of hub of pipe shall be 1'0" above grade. Connections from down spouts to leader boots shall be made by others. Each leader boot shall be held in position by a loop of 3/8" ϕ iron extending around the boots just below the hub with the ends built in the masonry walls.

347 - SOIL WASTE AND VENT PIPES:

This contractor shall furnish and install all soil and waste lines from sanitary sewers to fixtures and all vent lines from sewers and fixtures to a point 1'0" above the roof.

All soil and waste pipes shall be of cast iron, lead or brass pipe as hereinbefore specified. Main vent stacks shall also be of cast iron as called for above for soil and waste lines. Local vents for lavatories, slop sink, urinals, kitchen sink, drinking fountains, etc. shall be of genuine wrought iron.

The soil and waste lines from all first floor fixtures shall be installed as close under the first floor system as conditions will permit and as indicated on the basement floor plan.

All fixtures except showers in the boys' toilet room shall be connected to the same branch waste line. Slop sink in the janitor's closet and closet in the visiting team room shall also be connected to this line which shall be extended up through the first floor in the work space back of the closet in the visiting team room and connected to the main vent line five feet above the floor. The main soil line shall be continued from the point where the above branch is taken off to the space back of the closet in the visiting team room as noted, then continued as a vent line to a point 1'0" above the roof. A waste line shall be extended from the main soil line under the first floor and connections left at the first floor level to receive wastes from future laboratory sinks. This line shall be extended under the floor as shown, then up in the vent spaces at the side of the vestibule to a point above the roof as noted as noted above for main vents. Branches from the main soil stack shall be extended to the showers in the boys' toilet room and to the shower and lavatory in the visiting team room.

Soil and waste lines for fixtures in the girls toilet toilets adjacent to principal's office and teachers' rest room, domestic science room and dressing rooms at sides of stage shall be installed as indicated on the drawings with the main soil line in each case extending through the roof and serving as a vent for the entire group of fixtures. The waste line from the drinking fountains shall be connected to the soil line for the girls' toilet in the basement, extended up to the attic space and connected to the vent from the girls' toilet.

The waste and vent lines for fountains shall be of genuine wrought iron pipe. Local vents will be required for lavatories, slop sinks and urinals.

The sizes of all soil, waste and vent pipes shall be as indicated on the plans. No waste pipe shall be less than 2" except aht waste from fountains and lavatories may be 1½". All vent pipe, 3" and larger shall be of cast iron.

Malleable galvanized drainage fittings only shall be used for connections for genuine wrought iron pipe.

All connections to risers 3" or over in size shall be made with Y branches and 1/8 bends except where limited space will not give sufficient room for this fitting. In this case, sanitary tees may be used upon approval of the Architect.

Sanitary tee fittings may be used on 2" lines. All main soil and waste risers shall extend from horizontal sewers in basement up and to a point 12" above the roof. Pipe shall be increased one pipe size before passing through the roof.

The outlets of all risers 4" or over in size to be made 4" and on smaller risers the outlets to be 2".

All connections from cast iron soil, waste, and vent stacks and branches to the exposed N. P. piping of the fixtures or to closets shall be lead pipe, soldered to brass calking ferrule, calked into hub of cast pipe.

Unless otherwise indicated by the drawings and diagrams, branches to fixtures shall be as follows:

- 4" for water closets
- 2" for slop sinks
- 2" for urinals
- 2" for all other general fixtures.

All fixtures where traps require threaded connections to waste, outlets shall be connected to cast iron pipe with brass pipe as hereinbefore specified.

348 - FLASHING:

All pipes passing through the roof shall be flashed with lead furnished and installed by others. This contractor shall provide an opening in the roof slab only large enough to receive the pipe and shall bring all vents to a uniform height above the roof. The top of the pipe shall be dressed smooth.

349 - FLOOR, AREA, AND SHOWER DRAINS:

This contractor shall furnish and install floor drain in boiler room, exterior entrances to boiler room and agricultural Laboratory, area way and in showers on first floor as indicated on the plans. Drain in area to the entrance to the boiler room and Agricultural Laboratory shall be M-12708-9" x 9" top with 3" outlet. Drain in boiler room shall be M-12810-10½" top, 3" outlet. Each of above shall be as shown and described in James B. Clow and Sons' Catalog No. 50.

Drains in area in front of window in the boiler room shall be M-12704 - 3" x 6" top, 2" outlet. Drains in shower receptors shall be 242-A with 2" outlet and 21-K top with extension as shown and described in Catalog G of the Josam Manufacturing Company of Michigan City, Ind. Drains and extension fittings in shower receptors shall be of cast brass with strainers of cast brass, chromium plated.

All drains in basement entrances, areas and boiler room shall be connected to vitrified salt glazed pipe with cemented joints. Drains shall be installed with covers level and in alignment with walls, etc. Drains shall be set at levels required to provide pitch in floors as called for under concrete work.

350 - LEAD PANS:

This contractor shall furnish and install a pan of 1/8 inch thick lead under each shower receptor. Pan shall be installed on the structural slab and be continuous with edges turned up 3" on all sides. Bottom of pan shall extend over and be securely soldered to the seepage pan of the shower drains, forming a complete water tight barrier between the shower and the room below. Edges of pan shall be built in in the concrete curbs as the shower receptors are formed.

351 - COLD WATER SUPPLY:

This contractor shall furnish and install a 2" water supply pipe from the Water Service Company's main (approximately 170' from the front of the building) to the meter in the boiler room as noted on the plans. He shall also furnish and install the meter and pay all fees for tapping main, etc. The 2" service line shall be extended without reduction across the boiler room ceiling where branches shall be taken off as follows and extended to the fixtures and outlets.

- 1 1/4" to domestic water heater in the boiler room
- 1 1/4" to the heating boiler.
- 1 1/4" to girls' toilet with branches to kitchen sink, lavatories in dressing rooms, and drinking fountains.
- 3/4" to the toilets adjacent to the principal's office and Teachers' rest room.
- 3/4" to Science Laboratory with a 1/2" branch to each table.
- 3/4" to each wall hydrant.

Branches to fixtures shall be as follows:

Each Water Closet	- - - -	1/2"
" Urinal Tank	- - - -	3/4"
" Lavatory	-- - - -	1/2"
" Slop sink	- - - - -	3/4"
" Shower	- - - - -	1/2"
" Kitchen Sink	- - - -	3/4"
" Fountain	- - - - -	1/2"

All pipes in the basement shall be exposed. The 1 $\frac{1}{4}$ " line from the boiler room to the girls' toilet, etc. shall be placed in the heat tunnel where it crosses the Gymnasium.

All concealed cold water piping shall be of genuine wrought iron pipe. All cold water piping exposed in the basement shall be wrought pipe as hereinbefore specified.

352 - HOT WATER SUPPLY:

This contractor shall furnish and install all hot water supply piping from the tank and heater in the boiler room with branches to each lavatory, each shower, sink and slop sink.

A single 1 $\frac{1}{4}$ " main shall be connected to the hotwater supply tank and extended to the boiler room ceiling where branches shall be connected to main and extended to fixtures. A one inch branch line shall be connected to the main and extended through the heat tunnel under the Gymnasium to the fixtures in the girls' toilet, kitchen sink and lavatories in the dressing rooms.

Supply to fixtures shall be as follows:

Each Lavatory	- - - - -	1/2"
" Slop sink	- - - -	3/4"
" Shower	- - - - -	1/2"
" Kitchen Sink	- - -	3/4"

All concealed hot water piping shall be genuine wrought iron. All hot water piping exposed in the basement shall be of wrought pipe as hereinbefore specified. All hot water piping shall be installed to a slight, even, upward grade away from the supply tank, and shall be free from pockets, c

353 - HOT WATER SUPPLY TANK AND HEATER:

This contractor shall furnish and install a 30" x 84" storage tank and heater for hot water supply complete with all piping, valves, unions, smoke pipe, etc. Storage tank shall be of 1/4" steel with all joints riveted. Tank shall be equipped with manhole and reinforced for all pipe connections. Tank shall be mounted on a rigid frame of 2" pipe. Heater shall be "Ideal" - 07 - cast iron heater as manufactured by the American Radiator Company. Heater shall be

equipped with damper regulator mounted on the circulation line above the heater and connected to both check and draft dampers. Damper regulator to be No. 46 "Sylphon" as manufactured by the Fulton Company of Knoxville, Tenn. Tank shall be equipped with an "Ideal" red case thermometer #560 with 1/2" I.P.S. Stem as manufactured by the American Radiator Company. Thermometer to be graduated 100 to 200 degrees F. Tank shall also be equipped with a bronze, spring operated relief valve with 1" I.P.S. connection. Valve to open at 100 lbs. pressure.

This contractor shall also furnish and install a size 25 Excelsior Indirect Water Heater as manufactured by the American Radiator Company. Heater shall be connected to the House heating boiler by the heating contractor and connected to the hot water supply tank by this contractor. Pipes from tank to heater shall be installed with an even pitch to provide positive circulation.

354 - SHUT OFF AND DRAIN VALVES:

This contractor shall furnish and install a gate valve in the cold water service line on the street side of the meter and a gate valve with drip on the house side. Gate valves shall also be placed in the cold water lines to the water heater, to the boiler and in the drain line from the storage tank. All valves shall be as hereinbefore specified.

355 - PIPE SUPPORTS.

All vertical lines of cast iron pipe shall be supported at the base on the concrete floor construction and at intervals not to exceed ten feet on cast iron stack supports built in the masonry walls or resting on the concrete floors.

Horizontal runs of cast iron pipe shall be supported on ring hangers as hereinbefore specified spaced not over five ft. o.c. Horizontal lines of wrought pipe shall be supported on ring hangers spaced not over 10 ft. o.c. Hangers shall be supported from inserts in concrete as hereinbefore specified or from approved clamps on steel beams.

356 - AIR CHAMBERS:

Each connection to faucet on both hot and cold water lines shall be provided with an air chamber 12" long if concealed in walls or 6" long if exposed under fixtures. Tops of risers shall have air chambers as directed.

357 - EXPANSION AND CONTRACTION:

This contractor shall make all necessary provision for expansion and contraction to prevent damage to the system or to the work of other contractors, and shall replace all work damaged due to not making such provision.

358 - CONCEALED WORK:

No work of any kind shall be covered up before it has been examined and approved by the Architect.

359 - GAS PIPING:

This contractor shall furnish and install an 8" length of 1/2" wrought pipe under each laboratory table in the Science Laboratory for future gas service. Pipe to be installed 12" south of the center of each table. Both ends of each pipe shall be capped. All pipe shall be vertical and installed with the tops 4" above the floor.

360 - INSPECTION AND TESTS:

When all pipes are run in the building, before any fixtures are set and before any work is covered up, all calked and screwed joints and all iron pipe shall be tested by temporarily plugging all outlets and filling the whole system with water as directed by the Architect. Any leaks that may be discovered in the piping, fittings, valves and similar apparatus during the test shall be made tight and the test repeated until approved. Any split fittings, hubs or defective material or workmanship of any kind shall be removed and replaced.

The piping which cannot be tested with water shall be tested with air at a pressure equal to twice the working pressure to which it will be subjected in actual service and test maintained for at least an hour and longer if required without developing any leakage.

After completion, the whole plumbing work shall be tested by turning the water into the pipes, fixtures and traps everywhere in order to detect imperfections.

The whole expense of these tests must be borne by this contractor any any defect found must be remedied to the satisfaction of the Architect and all left in perfect order.

361 - PIPE COVERING AND INSULATION:

Cold water pipes will not be covered except where installed in outside walls or other spaces exposed to freezing

weather. Both hot and cold water pipes installed in such spaces shall be covered with 3/4" thick "Anti-sweat" covering consisting of alternate layers of heavy water-proofed asbestos paper and wool felt. Over this an additional 3/4" thick layer of hair felt shall be applied wired in place and the whole then covered with a canvas jacket and banded in place.

All hot water pipes and branches shall be covered with a sectional covering 1" in thickness Johns-Manville (original) ASBESTOCEL or equal finished with canvas jacket and metal bands. All fittings shall be insulated with a superior grade of asbestos cement brought flush with adjoining covering and finished with a canvas jacket.

All covering shall be applied to pipes, furred spaces, or other inaccessible spaces as the work progresses and at such time and in such manner as not to delay the work of other contractors.

All covering shall be protected until the work is finished and any that is damaged before the work is completed shall be replaced at his expense.

Water storage and heater tank shall be wrapped on both sides and ends with expanded metal lath wired in place. A one inch coat of asbestos cement shall then be applied on the lath. Surface of this coat to be roughly scored, then when dry a 1/2" thick finish coat of the same material shall be applied over it, finished smooth, this shall then be covered with two jackets of 6 oz. canvas securely pasted and sewed in place.

362 - WALL HYDRANTS:

Furnish and install at all points indicated on plan Clow's M-11130 - 3/4" wall hydrants with bronze face plates, nozzle and operating rod with loose key control. Hydrants to be installed in walls 12" below the top of the concrete base.

363 - FLOOR AND WALL PLATES:

This contractor shall furnish and install finished wall, ceiling and floor plates on all pipes passing through floors, walls or ceilings in finished rooms or spaces.

Plates shall be chromium plated Brass and shall be of type as approved by the Architect.

Groups of pipes shall have special combined plates.

364 - PAINTING:

Exposed pipe, tank covering, etc. shall be painted by others. All concealed pipe covering shall be given a coat of glue and alum size, then painted two coats of white lead and linseed oil paint in colors as directed by the Architect.

365 - SCHEDULE OF FIXTURES:

Basement

None

First Floor

11 - - - Closets
 8 - - - Lavatories
 5 - - - Urinals
 6 - - - Showers
 8 - - - Future Laboratory Sinks
 1 - - - Slop Sink
 1 - - - Kitchen Sink
 1 - - - Drinking Fountain

Second Floor

1 - - - Closet
 1 - - - Lavatory
 1 - - - Drinking Fountain

366 - FIXTURES:

All exposed brass piping, traps, faucets, valves, etc shall be nickel plated as called for in Plate numbers, etc.

All fixtures included in these specifications shall be furnished and set by this contractor in a neat, finished and workmanlike manner, making connections with all supply, waste, soil and vent pipes as hereinbefore specified or as may be directed. All fixtures shall be of the best of their respective kinds. All vitreous ware shall be vitreous, impervious and homogeneous throughout. All porcelain ware shall be class "A" porcelain. All enameled ware shall be of the best grade of white enamel iron, perfect in every respect. All n.p. plated brass pipe for waste or vents shall be of thickness not less than 16 ga. tubing. All chromium plated brass supply connections shall be of iron pipe size and thickness. All escutcheons shall be cast brass heavy escutcheons. All threaded fittings shall conform to wrought iron pipe standards.

The fixtures listed below, except as otherwise noted, were taken from James B. Clow and Son's Catalog No. 50.

367 - SUBSTITUTIONS:

The bids to be considered must include a bid on fixtures herein specified but contractor may and is requested to submit an alternate bid on not more than two other lists of fixtures he considers fully equal to those specified, providing he appends the name of the Manufacturer and figure number of each fixture he offers as a substitute. The Owner reserves the right to award the contract to the lowest responsible bidder on goods specified, or on any accepted substitutes proposed in the alternate bids submitted as above.

368 - WATER CLOSETS:

2 Re-
quired

Water closets in toilets adjacent to the principal's office and the teachers' rest room shall be Clow's "Undine" syphon jet water closets with Adamantose extended lip bowl with top inlet, large size, straight front Adamantose low down tank bottom pull operating device; 2 inch offset flush connection to bowl with china covering and top supply float valve with integral stop for 3/8" supply through back of tank complete as shown and described in Plate M-3078 except as follows - provide open front liped oak seats M-3390 only (1 1/2" stock) with chromium plated bar hinge and integral reinforcing band, "Renton" brass floor flange for lead pipe, asbestos gasket and china bolt caps for each closet.

10 Re-
quired

Water closets in girls' toilet, boys' toilet and visiting team room shall be Clow's "Nordic" Automatic syphon jet water closet with Adamantose bowl, Madden automatic valve with extension through wall and wall and wall flange, quartered oak seat with nickel plated box hinge and reinforcing ring, galvanized iron concealed closed tank and tank support, galvanized iron flush pipe, and Renton brass floor flange for lead pipe, asbestos gasket and china bolt caps for each closet, as shown and described in Plate M-2505.

369 - URINALS:

1 sin-
gle re-
quired.

1 Group
of Four
Required

All urinals shall be "Clow's full height solid porcelain" one-piece urinals with cast iron trap on ceiling below extended lip base and top inlet, Adamantose top supply tank with flow regulating stop and automatic flushing syphon complete as shown in Plate M-4090 (~~1-required~~) complete with loose extended shield overlap seam covers with all exposed parts glazed, and with chromium plated brass flush pipe, screws, etc. and supply connection with stop valve.

370 - LAVATORIES:

9 Re- All lavatories shall be Clow's "Ionian" size 18 x 20
quired complete as shown and described in Plate M-4455 G1.

371 - SLOP SINK:

1 Re- Slop sink in janitor's closet shall be Clow's solid
quired porcelain slop sink with integral back; Triumph 1/2" nick-
el plated concealed compression supply fixture with four
ball all metal indexed handles and cast brass escutcheon,
etc. complete as shown and described in Plate M-8355, ex-
cept with stop valves in supply lines below fixture.

372 - DRINKING FOUNTAIN:

2 Re- Drinking Fountains shall be Clow's "Adamantose" wall
quired fountain with integral back, concealed cast iron hanger,
etc. complete as shown and described in Plate M-6545 except
that all exposed metal parts shall be chromium plated brass
and with stop valve in supply.

373 - SHOWERS:

A shower shall be installed over each shower receptacle
in the girls' toilet and the visiting team room and two over
each shower receptacle in the boys' toilet.

6 Re- Each shower shall be Clow's chromium plated concealed
quired shower bath with 4 inch cast brass shower head with removable
face and adjustable ball joint, 1/2 inch bent arm to wall
with volume regulator and cast brass wall flange; Powers
concealed pressure equalizing mixing valve with integral
check, etc. as shown and described in plate M-5675. Delivery
pipes shall be securely anchored to the wall at mixers and
again at shower heads.

374 - KITCHEN SINK:

1 Re- Sink in Domestic Science Room shall be Clow's 20" x 24"
quired porcelain enameled iron sink with back, apron, right and left
hand drain boards all in one piece with concealed cast iron
hangers; Triumph 1/2 inch swinging spout, compression double
faucet with china soap dish, not tipped lever handles, etc.
all as shown and described in plat M-7010 except furnish
metal tips for handles to supplies instead of as shown.

375 - LABORATORY SINK:

Laboratory sink will not be furnished as a part of the
contract. Waste and supply outlets will be installed and
can ed for future installation.

376 - PROTECTION OF PIPES: ETC:

This contractor shall protect all pipes, fixtures and other parts of his work from injury by frost or other agencies during construction. All fixtures and materials under this contract are at this contractor's risk until the entire contract is finally accepted. He will also be held responsible for soiling of walls or any damage or defacement done by his workmen.

377 - CLEANING FIXTURES: ETC:

All fixtures shall be kept covered and not used during the construction period. All fixtures shall be cleaned of dirt, grease, stains, etc. and all plaster, etc. removed from pipe and equipment as a part of this contract.

378 - CLEARING SITE:

This contractor, upon completion of this contract, shall remove all his surplus material, tools, equipment, debris, etc. from the premises.

379 - GUARANTEE:

All work installed under this contract which shows defects within one year from date of acceptance shall be removed and replaced by this contractor without additional cost to the Owner. All work so replaced must be in strict accordance with the plans and specifications.

HEATING

380 - GENERAL CONDITIONS:

The "General Conditions", pages 1 to 15 inclusive apply to all contracts and form a part of and are included with these specifications for Heating.

381 - SCOPE OF THE CONTRACT:

This contractor shall furnish and install a complete Vacuum Steam Heating Plant for this building including boiler, accessories, pump, gauges, etc.; all pipe and fittings for supplies, returns and branches; all radiators, unit heaters, unit ventilators, heat control systems, etc; all covering, hangers, firing tools, sleeves, floor and wall plates, valves, traps, painting and other items as hereinafter called for.

382 - STANDARDS:

All material furnished under this contract shall be in accordance with the latest standard specifications of the American Society for Testing Materials and of the American Society of Mechanical Engineers as they may apply.

383 - MATERIALS:

All materials shall be new and the best of its respective kind.

Pipe. All pipe shall be standard "Merchant" steel pipe, full standard weight and size and shall be equal to that manufactured by the National Tube Company.

Fittings: Fittings for wrought pipe shall be equal to Crano's Standard cast iron fittings designed for 125 lbs. working pressure.

Hangers: Hangers, except for vertical piping, shall be solid stem, solid ring expansion hangers.

Inserts and Expansion Bolts: Inserts and Expansion Bolts shall be as hereinbefore specified under Plumbing, - Article No. 331

Unions: Flange unions shall be cast iron, standard weight, designed for 125 lbs. working pressure. Bolts for flange unions to be full weight with square heads and hexagon nuts. Railroad unions shall be of malleable iron brass to iron seat, ground joint for use without gaskets, all designed for 125 lbs. working pressure.

Gaskets: Gaskets for flange unions shall be of 16 oz. copper.

Valves: All valves over $2\frac{1}{2}$ " shall be flanged gate valves, standard weight, equal to Crane's #491. All other valves, except radiator valves $2\frac{1}{2}$ " and less shall be screw connection, standard weight, equal to Crane's #428. All valves shall be designed for 125 lbs. working pressure.

384 - WORKMANSHIP:

These specifications and drawings contemplate a complete and perfect heating installation, both in effectiveness and appearance, whether concealed or exposed and shall be executed by none except experienced and skilled mechanics.

385 - SHOP DRAWINGS:

This contractor shall furnish shop drawings as called for in the General Conditions showing all piping, valves, equipment, etc.

386 - MEASUREMENTS:

The drawings show the location of piping, boiler, radiators, etc. This contractor, however, shall verify all measurements at the building and report to the Architect for adjustment all errors or conditions which interfere with the installation of the work contemplated.

387 - CO-OPERATION:

This contractor shall co-operate with other contractors by furnishing exact locations of pipes, radiators, etc. and by setting inserts, sleeves, locating chases, installing pipe, equipment, etc. at such time as not to delay or interfere with the installation of other work on the building.

388 - SLEEVES:

Sleeves of 26 ga. galvanized iron shall be installed in walls and floors wherever pipes pass through them. Sleeves shall be maintained in proper position until built in. Floor sleeves shall be filled with sand before concrete is poured.

389 - HANGERS AND SUPPORTS:

All horizontal piping shall be supported on hangers as hereinbefore specified spaced not to exceed 10 ft. o.c.

Unit heaters shall be supported from the piping and by the balcony framing. Heaters shall be insulated on all sides with 1/2" hair felt cushion to prevent vibration.

390 - CUTTING AND FITTING:

This contractor shall do all necessary cutting of rough work, not impairing the strength of the building, required to properly install the materials furnished under this contract.

All cutting and fittings required in finished materials for the proper installation of the heating work will be done by the respective sub-contractors furnishing and installing these materials and in no case shall this sub-contractor do any cutting of finished work except that installed by him. He shall, however, bear the expense of all cutting required for the installation of his work.

391 - CONCEALED WORK:

No work of any kind shall be covered up before it has been examined and approved by the Architect.

392 - FOUNDATIONS:

This contractor shall furnish and install a concrete foundation for boiler as noted on plans. Top of foundation shall be finished 1/2" above the level of the surrounding floor. Bottom of excavation shall be level, dry and compact when concrete is poured. Concrete base shall have a minimum thickness of 18"

Top and exposed edges of foundation shall be finished as specified for basement floors under concrete work. All materials, method of mixing, etc. shall also be as specified under concrete work for basement floors. Top edges of foundation shall be neatly rounded with a narrow jointing tool.

This contractor shall also furnish and install a concrete foundation 12" in thickness for the pump discharge tank, etc. Foundation shall be 2" wider and 2" longer than the base plate of the pump and tank and shall be of concrete as called for above for boiler foundation. Top and exposed edges of foundation shall be finished as specified under concrete work for basement floor

A joint 1/2 in. in width shall be left on all sides between foundation and basement floor and filled after concrete has set, with 1/2" of asphalt. Anchor

bolts for equipment shall be set in place as concrete is poured.
393 - BOILER:

Heating boiler shall be Type K-portable up-draft fire box boiler as manufactured by the Kewaunee Boiler Corporation of Kewaunee, Illinois. Boiler shall be size Fourteen K with a guaranteed rating of 6200 sq. ft. of direct radiation in addition to the necessary piping. Boiler shall have a grate area of 20.8 sq. ft.

Boiler shall be complete less grates and damper regulator but shall have all necessary parts and provisions for firing with stoker. Boiler shall be set at exact height to receive the stoker - raising or lowering the foundation hereinbefore specified as required.

394 - EQUIPMENT AND ACCESSORIES:

The boiler shall be completely equipped with all necessary trimmings, including water column, gauge glass and try cocks, low pressure combination vacuum and pressure gauge, safety valve, feed water connections, firing tools, etc.

Gauges shall be Bourdon type spring gauges as manufactured by James P. Marsh and Company and shall have 4 1/2 inch dials, iron bodies and nickel plated rims. Each gauge shall be calibrated to register pressure up to 15 lbs. per sq. in. and down to absolute zero. Two gauges of the above type shall be furnished and mounted on the north wall of the boiler room and one side of the vacuum return pump. One gauge shall be connected to the boiler or steam header to register the pressure in the boiler; the other shall be connected to the suction strainer to register pressure or vacuum in the return lines. Each gauge shall be provided with a jet cock and mounted with syphon, etc. to prevent steam entering gauge and to insure correct reading. Safety valve shall be 3 inches - full size of opening in the boiler. Safety valve shall be set to blow at 20 lb. pressure. A 1 1/4" all brass horizontal check valve and gate valve as hereinbefore specified shall be furnished and installed for feed supply - plumbing contractor will extend and connect water supply pipe from the water lines to the gate valve. Firing tools shall be furnished for emergency firing, removing ashes, clinkers, etc.

395 - SMOKE PIPE:

Smoke pipe shall be of ten ga. Armco iron, welded connections. Pipe shall closely fit the smoke connection of the boiler and the thimble in the chimney.

Pipe shall be bolted to the boiler and extend to and be flush with the inside of the chimney. All open spaces between pipe and thimble shall be completely filled with boiler cement.

396 - STOKER:

Stoker will be furnished and installed under a separate contract. This contractor, however, shall furnish boiler front and boiler equipment required for installing it. This contractor shall also furnish and install all equipment for controlling the stoker automatically as a part of the heat control system.

397 - VACUUM PUMP, TANK, ETC.:

This contractor shall furnish and install a size "V" vacuum heating pump complete with 1 H.P. motor, pump, receiving tank, base, strainer, float, vacuum and float regulator for automatic control - all as manufactured by the Nash Engineering Company of South Norwalk, Conn.

Pump shall be complete for continuous or intermittent operation, maintaining a vacuum and returning condensation to the boiler when operating under vacuum control or returning condensation to boiler with system under pressure when operating float control. Air, in either case to be automatically ejected. Pump shall have a capacity of fourteen gallons of water and six cu. ft. of air per minute against 20 lbs. discharge pressure.

The switch, motor controller, motor starter, motor pump, discharge and accumulation tank, float discharge unit, etc. shall be mounted on a single cast iron base. Base shall be installed on a 2" thick cork insulation over concrete foundation as hereinbefore specified. Base shall be secured to the concrete foundation with 1/2" bolts. Cork washers or gaskets shall be used around the bolts where they pass through the cast iron base. Motor shall be 110-220 volt, 60 cycle, A.C. three phase, connected as a unit to the starter, controller and safety switch.

The contractor for electrical work shall connect conduit from power circuit to and make all power connections to safety switch called for above. Gate valves, as hereinbefore specified shall be furnished and installed on each side of this equipment.

398 - BOILER CONNECTIONS:

Steam supply connection to the boiler shall be full size of the supply connection, return connection shall be bushed to 4 inch, the size of the return main. The steam header shall be of pipe, full size of steam supply opening in the boiler. Header shall be connected to the boiler with a short nipple and standard ell. Header shall be at least 5'0" long, extended as indicated on the plans with a reducing tee at the end. Tee shall be installed with the side opening on top. A 4 inch drip and equalizing pipe shall be connected to the end of the reducing tee, extended down and connected to the return connection to the boiler. A standard tee shall be installed in the vertical equalizing line to receive the discharge line from the vacuum pump.

The return tee shall be installed with the center of the incoming line 4" below the water line of the boiler. i.e. the discharge line from the return equipment shall be through a Hartford connection.

399 - JOINTS:

All screw joints in both brass and iron pipe shall be in accordance with American Standards; dies shall be sharp and accurately set to form a perfect joint. All burrs and cuttings shall be removed; all pipes shall be cleaned and reamed; threads shall be coated with red lead paste and the pipes tightly assembled with not more than one turn of threads projecting from the fitting.

400 - EXPANSION AND CONTRACTION:

Due allowance shall be made in the installation of piping for expansion and contraction. Contractor shall install system with as long spring pieces as possible and provide all expansion loops or joints required for perfect and noiseless operation.

401 - SUPPLY MAINS:

A close nipple of six in. pipe shall be installed in the top opening of the tee at the end of the steam header. A reducing tee shall then be installed in the opposite end of the nipple to receive the steam supply mains. Mains shall be extended as indicated on the plans with a uniform pitch of one inch in twenty-feet away from the boiler. Standard tees shall be installed in the mains to receive connections to radiators. Tees shall be set up to receive the branches at an angle of forty-five degrees. Mains, over the boilers, shall be installed close to the ceiling. Sizes of all mains and branches shall be of sizes specified

or shown on the plans. Mains shall be valved and dripped at ends before connecting to return mains.

402 - RETURN MAINS:

Return mains shall, in general, be installed alongside the supply mains. All return mains shall be of size and installed as indicated on the plans. Return mains shall be installed as high as possible with a uniform pitch of one inch in twenty feet toward boiler. Tees as called for above in supply mains shall be installed from top at forty-five degrees to receive all branches, etc.

Special attention shall be given to workmanship to avoid pockets, traps, leaks, etc.

Connection to drip from supply mains shall be made as indicated. Return mains shall be connected in the boiler room forming a single line before connecting to the strainer of the receiving tank and pump.

403 - SUPPLY RISERS:

Supply risers shall be connected to mains at forty-five degrees for drainage of spring piece, riser, and branches to mains. Proper provision shall be made for expansion and contraction. Size of risers shall be as noted on plans. Spring piece or branch connecting riser to main must be one size larger than riser and must be installed with a pitch of not less than 1/4 inch per ft.

404 - RETURN RISERS:

Return risers shall be installed in similar manner to that called for above for supply risers with connections to return mains at forty-five degrees with proper allowance for contraction and expansion. Sizes of risers to be as called for on plans. Spring piece or branch connecting riser to main must be one size larger than risers and must be installed with a pitch of not less than 1/4 inch per foot.

405 - RADIATOR CONNECTIONS:

All branches from supply and returns to radiators shall be taken from the top of mains at an angle of forty-five degrees. They shall be installed with a pitch of not less than 1/4 inch per foot and, unless otherwise noted

on plans , shall be one size larger than risers on radiator connections. Special attention shall be given to grade and to provision for contraction and expansion. Connections shall be made at the top of all radiators.

406 - RADIATION:

This contractor shall furnish and install all radiation in units as called for on plans. All radiation, except as otherwise noted shall be Corto cast iron radiation as manufactured by the American Radiator Company in sizes, number of sections, tubes and heights, as called for on the plans. All cast iron radiators shall be provided with top tapping for supply connection and with eccentric bushing in return tapping. Radiators in the Germinating Room and Agricultural Laboratory shall be standard cast iron wall type radiators in sizes and sections as noted on the drawings. All air valve tappings shall be plugged. Cast iron radiators shall be given a prime coat of paint at the factory. Cast iron radiation shall be cleaned out thoroughly before installation.

Cast iron radiation in the Germinating Room and Agricultural Laboratory shall be installed on the ceiling of the rooms and supported on trapeze hangers secured to inserts or bolted to the steel flooring beams. Vertical parts of hangers shall be of 1/2" and horizontal members of 3/4" pipe. Horizontal members shall be equipped with a pipe cap on each end to hold the pipe in place.

Unit ventilators shall be type S.D. as manufactured by the Herman-Nelson Company of Moline, Illinois. Univent shall not be constructed for re-circulation but shall be equipped with movable dampers in the fresh air intake arranged for remote control by the heat control system.

Each univent shall be complete with fresh air intake box and grille, movable dampers at air opening and at top, grille at top, cabinet, heating element, fan, motor, etc. for continual and satisfactory operation. All univents shall be of size and capacity as called for on plan. Fuse blocks, hand operated switches and speed control system shall be furnished as a part of each univent. Unit heaters in the Gymnasium shall be #180 Hijet heaters as manufactured by the Herman-Nelson Corporation. Each heater shall be equipped with a 1/3 H.P. motor and shall deliver 2350 cu. ft. of air per minute at 560 R.P.M. Motors and fans shall be constructed for continuous and silent operation under full load. Each heater shall have

a capacity of 168300 B.T.U. per hr. operating in seventy degrees air. Heaters shall be constructed and installed for full automatic control of both heating element and motor. Unit heaters shall be mounted in front of and supported from the framing for the balcony. Supports shall be installed and insulated in such manner as to prevent vibration and noise being transmitted from the heater to the building.

All motors for unit heaters and unit ventilators shall be 220 volt, 3 phase, 60 cycle. Motors for unit heaters shall be single speed. Motors for unit ventilators shall be constructed for variable speed by means of speed controller as noted above.

407 - RADIATOR VALVES:

All radiator valves, except for radiators in the principal's office, the teacher's rest room, the girls' toilet, the boys' toilet, the visiting team room, germinating room, agricultural laboratory, ticket office, stage, dressing rooms and corridors, shall be furnished as a part of the heat control equipment. They shall be furnished with hand operated discs and installed at the same time the radiators, unit ventilators and unit heaters are installed. After the system has been cleaned out and all other work completed the hand operated discs shall be removed and the motors and motors and motor controlled discs installed in place of them. The motors and motor controlled discs shall be installed by the manufacturer who furnished and installs the heat control equipment. All valves shall be of the bellows, packless type for installation and operation without loss of steam or leakage of air.

All valves not specified above to be furnished as a part of the heat control equipment shall be Warren-Webster Company's #575-W sylphon packless quick opening radiator valves with rough brass nickel plated bodies and round wood handles.

Valves for all cast iron radiators shall be $3/4"$. Valves for 4500 series unit ventilators shall be $1\frac{1}{2}"$. Valves for all other unit ventilators shall be $1\frac{1}{4}"$. Valves for #18 unit heaters shall be $1\frac{1}{2}"$.

408 - RADIATOR TRAPS:

Each cast iron radiator, each unit ventilator, and each unit heater shall be provided with a Warren-Webster Co. sylphon trap. Traps for cast iron radiators shall be installed direct to the return fitting of the radiators. Traps for unit heaters and unit ventilators shall be installed at the end of a cooling leg as recommended by the manufacturer

of the ventilators and traps. Traps for cast iron radiators shall be 1/2". Traps for series 2500 unit ventilators shall be 3/4", and traps for other unit ventilators and unit heaters shall be one inch. End of each steam line shall be dripped through a Webster class "B" strainer and 3/4" trap as called for above for radiators.

409 - HEAT CONTROL:

This contractor shall furnish and install a complete system of electrical control as manufactured by the Barber-Coleman Company of Rockford, Illinois for all unit heaters, unit ventilators and all cast iron radiators installed in rooms where unit ventilators occur. The system shall be complete with transformer, switches, conduit, wiring, radiator valves, motor damper operators, thermostats, stoker control, etc.

Transformer, for supplying current to operate the various units, shall be located in the boiler room. Transformer shall be mounted in a suitable metal receptacle; conduit shall be connected to the box and extended as required to carry wires to thermostats, valves, damper operators, motor controllers, etc. Wire shall be 14 gauge, rubber covered, single braided copper wire. Conduit and box for conduit shall be as hereinbefore specified for electrical work. Conduit outlets shall be of type required for the different locations.

Unit heaters shall be provided with a motor operated valve controlling the steam supply and a tilting mercury tube switch connected to the supply valve, opening and closing the switch controlling the fan motor.

Steam supply and each damper to each unit ventilator shall be controlled by a motor operated valve or motor operated reversing damper regulator. The motor operated steam supply valve shall be controlled by the damper regulators. The steam supply valves shall open and close with the damper.

The cast iron radiators shall be controlled from the thermostat in conjunction with the unit ventilators; the radiator valves being open only when the temperature of the room falls below the setting of the thermostat.

The stoker shall be controlled from a relay switch connected to the room thermostats and operated by them. The stoker control shall be arranged so that its operation may be changed to suit conditions of the weather or controlled manually without interfering with the control of the radiators, unit ventilators, etc.

410-4 CLEANING SYSTEM AND TESTING:

After boiler and all piping has been installed and all radiators set the system shall be cleaned thoroughly. Radiators shall be connected with union elbows in place of traps and hand operated discs used on supply valves during the cleaning period. Pump shall not be operated while the system is being cleaned and condensate shall be wasted to sewer. The system shall be operated while connected in this manner until the condensate is clear, supplying water at bottom of boiler to maintain proper water level at all times and maintaining a pressure of approximately 5 lbs. When dirt no longer appears in the condensate, remove the safety valve and connect a temporary pipe from safety valve tapping to drain. Close all radiator valves and disconnect lines to radiators not supplied with valves. Fire with wood fuel, maintaining a pressure not to exceed 10 lbs. Keep boiler filled with water to top of gauge glass, constantly supplying water at bottom of boiler to maintain this level. Continue this operation for six hours, then draw fire quickly, close feed water valve and open blow-off at bottom of boiler allowing boiler to drain completely. After boiler has cooled, replace the safety valve, remove the temporary union elbs from radiators and install traps and control valves. After boiler has cooled, fill with water to top of gauge and open valves to pump, accumulator tank, etc. When boiler has filled to level as noted above, test the entire system by running the pump while the water is cold until a vacuum of 15 inches is reached on the system, stop pump. A vacuum of at least ten inches should remain in the system at the end of 1/2 hour after pump has been stopped. If the vacuum is less at the end of above period, the entire system should be looked over, all connections tightened and the test repeated until the above conditions are met. All concealed piping shall be tested with cold water at 50 lbs. pressure and proven tight before enclosing. After system has been tested and approved it shall be fired and checked for distribution and circulation of steam in all radiators, re-testing for tightness if necessary to secure an even distribution of steam throughout the system.

411 - INSULATION:

All steam piping, spring pieces, steam header, header bleeder or equalizing pipe, and boiler, shall be insulated. Insulation will not be required for return piping except when it occurs in or adjacent to outside walls where it shall be covered in the same manner as supply piping.

Pipe covering shall be standard thickness, 3-ply "Asbestocel" as manufactured by the H. W. Johns-Manville Company. Covering shall fit the pipe closely and be pasted and banded in place. The single canvas with bands will be satisfactory over covering for concealed pipe. All covering for exposed pipes, however, shall be protected with an additional layer of 6 oz. canvas, drawn tight and securely pasted over the inner canvas and then banded. Bands will be spaced not over 18" o.c. All fittings in pipe lines where covering is called for shall be plastered flush with asbestos cement and covered with canvas as called for above for covering. Cement over fittings to be applied while the pipes are hot.

Boiler shall be covered with 24 gauge expanded metal lath securely wired at laps as hereinbefore specified for metal lath under plastering. A 1" thick coat of asbestos cement shall be applied over the lath covering the entire surface of the boiler except for removable parts. This coat shall be broomed or scratched before setting to provide bond for the finish coat. After the base coat has set, finish with a 1/2 inch thick coat of asbestos cement carefully smoothed on and neatly finished about doors, etc. All cement shall be applied while boiler is warm. When finish coat has set, cover with a 6 oz. canvas jacket securely pasted and sewed in place.

412 - PAINTING:

Exposed pipe, boiler covering, etc. shall be painted by others. All covering where pipes are to be enclosed shall be coated with varnish size - before bands are applied. When size coat is dry and bands are in place, cover with two coats of white lead and linseed oil paint. Boiler and exposed threads of pipe that are to be covered and all pipe and fittings in concealed spaces shall be cleaned thoroughly and then given one heavy coat of asphaltum paint before covering is applied or pipes are enclosed. White lead and linseed oil paint shall be of materials and mixed as hereinbefore specified for painting for this building. All exposed metal work of univents shall be finished with baked enamel.

413 - TEMPORARY HEAT:

If heat is required before the building is finished, and allowance of five dollars (\$5.00) per radiator shall be given this contractor for each radiator set. Radiators set for temporary heat shall be connected with union elbows and temporary traps. Radiators shall be set at a distance of 12" to 18" from the wall and properly protected at all times. The cost of setting radiators shall be borne by the contractor whose work required the additional heat. This contractor shall furnish an attendant to operate the system for the entire period that temporary heat is required. Fuel for

temporary heat and the expense of furnishing an attendant shall be borne by the contractor for whose the heat is required. This contractor shall be responsible for all damage to the heating plant while being operated in this condition except that other contractors shall be responsible for damage to radiators, piping, equipment, etc. caused by falling material or accidents due to the installation of work under their contract. The approval of the Architect must be obtained for the arrangement and number of radiators set etc. before temporary heat is supplied by this system.

414 - FLOOR AND WALL PLATES:

This contractor shall furnish and install finished wall, ceiling and floor plates on all pipes passing through floors, walls or ceilings in finished rooms or spaces.

Plates shall be nickel plated brass and shall be of type as approved by the Architect.

Groups of pipes shall have special combined plates.

415 - CLEANING AND CLEARING SITE:

This contractor shall cover all radiators and protect all pipe, fittings, valves and other equipment during the entire construction period and upon completion of all other work, shall leave all materials furnished and installed by him clean and free from oil, dirt, grease, or other material and ready to receive the painter's finish. He shall also bear the expense of refinishing or cleaning the work of other contractors soiled or damaged due to the installation of this work.

This contractor, upon completion of this contract, shall remove all his surplus material, tools, equipment, debris, etc. from the premises.

416 - GUARANTEE:

All work installed under this contract which shows defects within one year from date of acceptance shall be removed and replaced by this contractor without additional cost to the Owner. All work so replaced must be in strict accordance with the plans and specifications.

